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### APRII, 1983 Vol II. No 5

# News & Reviews

GAMES NEWS 16 new adventure, and we check out games packs for the Sharp MZ-80K.

VIDEO SCREENS games centre that provides its own een, discover the Vectrex. And Mat-

ARCADE ACTION Meet O'bert, the 'qute' character, that US video gamers took to their hearts.

REVIEWS Salaxians take flight on the Atari, and there's a host of horrors in the Spectrum
3D Turnel Find out how they fare.

NEXT MONTH
Read all about our involvement new BBC TV series



# Listings

TRAFALGAR Relive the era when mastery of the seas meant mastery of the world. Opposing admirals of the fleet take to the high seas, trying to outwit one-another and the elements as they manoeuvre their ships into

ion. All hands to the ZX81 SKYSCRAPER 35 Finding a place to park your jet in a city of skyscrapers gets more ringing a pace to park your jet in a city or skyscaspers gets more difficult every day, the car parks are all full, there's double yellow lines everywhere, and those dreadful traffic wardens . . oh, and there's all those buildings too. Come down to earth with a bang on

Out in deep space in deep trouble! Unless you can find your way through the dangerous meteoroid field to the refuelling station.

DRAGON RUN Once upon a time in a land far away there was a dragon-hunter -

and lots of dragons. Piery-fun for Atari 400/800 owners with a taste for ELECTION

So you think you'd make a great MP eh? Well, just try convincing the voters. All the action of a general election in this party political program on behalf of Pet owners. BLOCKBUSTER

out, or will you be doomed to roam the maze forever with only you Atom for company?

Yes, it's that lovable little munchy-man again! This time you can enjoy a snack between meals on your BBC model A. But watch out for

I'm a lumberjack and I'm not OK . . . that pesky bird keeps on stee

Follow the leader in this version of that popular electronic game written especially for the Sharp MZ-80K. Can you beat the computer?







# Avast landlubbers! Harken back to the days when Horatio Nelson ruled the Seven

Sees with a red of iron and 15th of cannonball.

Our Trafalgar game recon structs the thrills of the great sea hattles when Men O'War clashed with countries and kingdoms teetering on the outcome.

Our ZX81 game gives two rival admirals fleets to command as they battle one another. plus the elements in this thvilling game of strategy.

Election transports you into Pet politics with the hard job of vote-winning to put your party into power at the next general election. And with the current state of politics it could be a test run for the real thing in a couple of month's time.

Logger offers a different look at the Donkey Kong game featuring a lumberiack and a far from helpful bird. It runs on the Vic-20 computer.

Then there's space drama dragons and a deadly maze. The fun starts here!

# Features

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Editor Terry Pratt, Staff Writer Eugene Lacey, Editorial Publishing Asst. Sunn Cameron, Art editor Linda Presman, Production editor Tim Metcalfe, Advertisement manager Eta Lowiz, Advertising executives John Philips, Louise Mathews Advertisement assistant Louise Flockhart, Publisher Ton Moloney Editorial and advertisement offices: Durrant House, 8 Herbal Hill, London ECIR SR; Telephone Editorial 01-278 6556, Advertising 01-278 6550.

Trapped in a deadly maze of giant blocks - can you blast your way

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# REFR GETS THE **GAMING BUG**

Computer gaming is making its first impression on television this month in a Saturday morning programme which is taking over the Saturday Super Store slot.

Get Set (for Summer) will be featuring computer games throughout its 16 week series which runs up until the school summer holidays.

The programme aims to give practical ideas on new hobbies. sports and other activities to try out or take up during the summer holiday. And series producer Tony Harrison is a home computer owner keen to demonstrate the new world which a microcomputer can open

The first programme in the series goes out on April 2nd and features not only home computers but also TV games centres and arcade

And the series is also unique in having a microcomputer-controlled system of "cue-ing" programme presenters Mark Curry and newcomer Deborah Appleby. This system runs on a BBC Microcomputer and was written by the producer's son Daniel.

The presenters will be able to look up during the programme to check on how much time is left on any particular interview or demonstration. Events during the programme can be reshuffled on the screen to change the order of programme features or fit in new items

Computer & Video Games will be helping out during the series and the slot on Saturday April 16th will be of particular interest to all computer games programmers. As home computing

comes of age throughout Britain it is ironic to think that 1983 may go down as the Year of the

Home Video Game. Our Video Screens section has already been full of the rich promise of new games and new

machines which should be with us before 1983 ends. The Colecovision launch should (lawsuits permitting) provide the

industry with some much-needed



Me 'n my newsagent are real close. His name's Bill or Fred or something ... Anyway we got an arrangement. Every month, you know what he does? He looks out my copy of Computer & Video Games and keeps it, just for me

So none of the other punks on the street can get hold of my cony. And that's important to me. Mebbe it's important to you too. So go n' see your newsagent with that coupon below all filled out. If he's like Harry here, you're

compatibility when it adds the Atari and Intellivision expansion modules

gonna like him.

Intellivision's manufacturers, Mattel, are opening up the software market by bringing out their top games in Atari format, on the M Network series

In our May issue, Eugene Lacey takes a look at the new way to cut the cost of home video gaming by renting the cartridges rather than paying around £20 plus to find out you've tired of the game after the first couple of days.

Several companies have sprung up offering cartridges for hire and the latest move is for public libraries to open up a software section

Arcade games players will have another chance to enter our Best Arcade Player Championship and we'll be printing up some scores to aim at on different machines in our record breakers section.

But although the records give some idea of what is possible, reTo my newsagent: Please deliver reserve me a copy of Computer and Video Games every month. Price 75p.

Name .										
Addres	is									

member that they still have to reproduce those scores and get them signed by the arcade owner in the next three months.

Mad Max is the most interesting listing we've had for some time. Our reviewer rates it as the best driving game he has

ever come across on the Sharp and the course certainly looks to include some fascinating features. So rev up and get ready to drive off into the future with Mad Max in May.

Add a new dimension to gobbling games with the Ghost's Revenge by Gareth Iones. This is a novel two-player extravaganza for the Dragon 32 which could spell the end of Pacmen as we know them!

One player tries to munch his way out of trouble, the other takes control of the ghostly pursuers.

Then there's Tank Battle for the BBC B and an arcade-style attraction called Grow-Worm wriggling its way out of the Atari 400/800.

# No.1 Best Sellers for Your Spectrum!\*



Experience mediatings of st., Cinkents Andesti of Ayest 48K Spectrum. Danger, adventure and excitement are all part of it in words and graphics, but it is you who must solve the problems. Special features never seen before. THE HOBBIT is the program everyone is talking about. PENELIA/JOK is the most antizing and sophisticated arcade game yet devised for the 48K Spectrum. Features include training mode, unique customizing, superior graphics, excellent sound and more! \$6.95.

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Please drop us a line at: Computer and Video Games, EMAP, Durrant House, 8 Herbal Hill. London ECTR 5JB

# TRADE WITH **FNFMIFS**

If at the start of a turn in Seventh Empire you are in an omnire at war with a neighbour can you Move to a neutral neighbour and then Trade with the previous enemy in your second movement phase? Roy Rogers

Editor's reply: No. As you still are considered to belong to the empire whose star you began the turn at, such a Trade would be illegal. But keep trying Roy!

# **PLUNDERING FOR PROFIT**

Dear Sir. I have calculated my score to be just outside the Top 10 Seventh Empire commanders you published last issue and I'm kicking myself for not following Mr Tactico's example and Plundering rather than Cargo-ing.

My two Cargo moves were both robbed of profit by greedy pirates and I wonder if there's any profit to be had in ever travelling by Gateway except on a Plunder mission Is this a valid flaw in Seventh Empire? Please comment.

Still, I can congratulate myself on some good trading and I am enjoying a marvellous sense of anticipation awaiting next

month's results. D. Andrews.

Welwyn Garden City. Editor's reply: Seventh Empire tactics will evolve over the next few months Mr Andrews and players will change from Cargo to Plundering, as I suspect that you have done. And when so many people are Plundering Gateway routes,

Cargo and the pirates profits will plummet. In our first go, Cargo shippers actually faired better than the Plunderers and many of our top 10

accumulated profits on a number of Cargoes. Much of the excitement of The Seventh Empire will be in seeing how the winners have applied their tactical thinking to the number of players in the game. Very soon Attacks may prove a big profit booster as players learn to spot isolated star systems

vulnerable to a large influx

of Attackers.

# PROBLEMS IN THE EMPIRE Door Sir.

Several problems have arisen with the Seventh Empire and I feel they can be best

answered in writing. In working out profit through Trade, do you us the issue with the order sheet you send in, the following

issue or both issues? To work out Plunder and Cargo profit you need to know the number of fleets using this route.

How do you discover this?

there will be a reluctance to I How do you find out the Battle

I. A. Howes South Croft. St Johns Wornerton

Editor's reply: Trade profit is worked out by comparing the trade index of each star in the issue following the one you sent your orders in for. So the March move is calculated by the figures on

April's Galactic Map. Plunder and Cargo is worked out by checking the Gateway Route Table. Find the star you moved from in the vertical column and move across until you reach the star you moved to horizontally. The figure there gives profits for either merchant or pirate. Battle Bonuses are given in the

# Battle Reports section. WHAT'S IN A PEEK?

Dear Sir. I am a beginner in the world of computers. I would like to know the equivalent of (PEEK 16398+PEEK 16399) on the BBC machine, it is in the Mole program (Jan 1982) for

the 78811 What are graphic characters? Has the BBC

machine any? Mr S. Alg. Fulham, London

Editor's reply: PEEK 16398+256\*PEEK 16399 in ZX81 Basic gives you the address of the PRINT position in the display file. This is not necessary on the BBC m/c as it has a memory mapped screen, So . . . it is

not possible to easily translate this to BBC Basic. The BBC has 32 user

defined graphics characters. Again, read. page 170 of the manual for a full explanation of how to use the VDU23 command. Needless to say, it is nonstandard!

# STAR WARS HIT HOME

Dear Sir, If a Seventh Empire fleet Moves or Trades between two friendly stars on its first movement phase can it Move or Trade with a star at war with the star it has arrived at in the second movement

Ron Murch Downs Barn. Milton Keynes Editor's reply: In neither movement phase is a fleet allowed to Trade or Move to a star at war with any

### star it has left or visited during that turn DON'T QUIBBLE **OVER BBC**

Dear Sir I write in reply to a letter by Alan McAuley which appeared in your December

issue I would like to know to what application a ZX Spectrum can be put that a BBC machine cannot cope

with I admit that the model A is expensive, but the BBC machine was designed with expansions in mind. This means that it has a very wide range of practical applications

I personally have a BBC model B and although I haven't seen the Spectrum, I have seen the ZX81 which doesn't even come close

In any case to say that Sinclair machines are the best micros on the market is ludicrous, they are the cheapest, and from what I have seen you get what you pay for.

This is not a quibble concerning the Spectrum and BBC machines. I know which is best and this is reflected in the machine I have bought. David Hetherington, London.

# KRAZY KONG ...



An expanded screen presentation with rolling barrels, hammer. fireballs, lifts, handbags and umbrellas as you try to rescue the Damsel Kong has abducted. Spectacular collapse of Kong's lair in fourth screen. Uses all 21K of your expanded Vic for this 100% m/c thriller. Complete with high score table K B / I S 16K 27.90

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Find Dracula before he rises and drive a stake through his heart in this multi-screen graphical adventure. K B 3K 96 00

### FOR THE UNEXPANDED VIC 20 ... £6.00

### FROGRUN

All m/c game with brilliant graphics and sound effects with features like busy highway, snakes, crocodiles and lady frogs. K.B./J.S.

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All mic version of Centinede Homing spider, mushroom laying flea and multi-direction travel makes this game fast and furious

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# IMPERIAL

Dear Sir,
If, in the Seventh Empire, a
person making negative
profit ends his turn on the
same star as an Imperial
Ship, will he lose twice as
much or half as much? And

how do I control an Imperial Ship? Stephen Loughran,

Stephen Loughran, Agamemnon Road, London, NW6

Editor's reply: He loses twice as much. Stephen, which means that Imperial Ships can be used to inflict hard times on rivals, as well as boosting your own profits.

It makes these ships a double-edged weapon. A ship can be controlled by putting all your ships into stars belonging to one empire and gambling that you will be the richest player to have tried to wrest control of that empire's ship.

# SKILL AND THE DRAGON

Dear Sir,
Your correspondent in the
February issue may be
interested to know that I have
tried the Tandy game Project
Nebula and Chess on my

The first works perfectly and the second only runs in skill level eight, the most difficult

This is because the Dragon does not respond to the "L" command which is supposed to select the skill level. Has any reader managed to solve this problem?

C. A. Sanders,

Guiseley, Leeds.

# DEBUGGING A SPACE LASER Dear Sir.

In the November issue of Computer and Video Games you featured a game for the T.I. Space Laser.

Who did it this time? Mal Function, T-Hitch, Snag Jnr or Screaming Foul Up?

# MAILBAG

The bugs I found and debugged lines are: 420 CALL CHAR (112, "0000163065301800") 1100 PRINT "GAME OVER" 1170 PRINT "YOUR SCORE ISTASTRASSC)

1260 GOTO 620 Line 1470 should be deleted. 1510 CALL HCHAR (24, 2, 32,

There were bugs in lines 1530, 1570, and 1880. If there are any other bugs could you print the solution to them. Also could you print a Defender type program. I am begingt to make a

hoping to make a contribution to your pages. PS. Hungarian Hex was a real mind bender!

A. Howarth, Wigan, Lancashire.

# COMPUTER IS VERY RUDE!

Dear sir,
I have managed to use a
telescope properly and the
reward was a terrific view of
what looks like a snake in the
grass but I can't use anything
else that the F-man gives me.
And my computer is rude to
me for trying. Help!
Gareth Mulgrave,
Nottincham.

Nottingham.

Editor's reply: Do not ignore
a single word of the text or
any of the music.

The uses of the Pi-man's gifts are quite logical.

If you do silly things like trying to use your Deaf Aid in the Waste Disposal Unit, or use your Hang-glider in the Canal, then we are not surprised that your computer is losing



# COMMANDING THOSE STICKS

Dear Sir, Your February issue of Computer and Video Games included a Missile Command game for the Dragon which I have amended for joysticks. First delete lines 340 and 350 and chance lines 330,

360, 370, 380, 430, 440 and 500 to: 330 Z=JOYSTK(0):ZZ=JOYSTK (1):IF Z>10 AND Z<50 and ZZ >10 and ZZ<50 THEN 360 260 IF Z>50 THEN

A=A+5:IF A>255 THEN A=255 370 IF Z<10 THEN

A=A-5:IF A<0 THEN A=0 380 IF ZZ>50 THEN B=B+5: IF B>170 THEN B=170 430 IF ZZ<10 THEN B=B15: IF B=10 THEN B=10 440 F=PEEK(65280):IF F=

126 OR F=254 THEN F =RND(3):GOTO 500 500 U=F:IF M(U)=0 THEN 450 The crame now uses the

right joystick. With the above amendments I have found the game easier to play and, to date, my highest score is 10,350. Richard White,

Rotherham, S. Yorkshire IS THIS A RFCORD?

Dear Sir,
We have currently solved/got
maximum points in the
following adventures for the
Video GenieTRS-80:
Adventureland, Pyramid 2000,
Pirate's Cove, Raaka-Tu,
Mission Improscible Lords of

Video Genie TRS-80: Adventureland, Pyramid 2000, Pirate's Cove, Raaka-Tu, Mission Impossible, Lords of Karma, Voodoo Castle, Dog Star, The Count, Moonbase Gamma, Strange Odyssey, Lord's Keep, Mystery Fun House, Asylum, Curse of Crowley Manor, Asylum II, Golden Baton, and we are currently working on Pyramid

of Doom.

Is this a record?

P.S. If you think Asylum is

difficult, just try Asylum III P.P.S. If C&VG wants hints, we might consider payment — not a year's subscription, please!

P.P.P.S. If you ever consider replacing your Adventureland columnist, please let us know! Simon French and Craig Heath, Warwick.

Wedwich.

Keith Campbell replies: The Editor rolled about the floor with uncontrollable mirth when he read your letter! The thought of getting rid of me tickled him no end. Then Sue mentioned the bit about payment, and he quickly recovered and brewed himself a cup of strong coffee!

I pointed out I had solved Savage Island!! He said "Part 2?" and there was a deathly hush.

P.S. I might be mad, but I'm not stupid! P.P.S. You'd be better off

P.P.S. Tou d be better on with the year's subscription! P.P.P.S. I've a wife, three kids, a micro and a Tax Inspector to support — so hands off!!

# MISSING LINX . . .

Dear SIT,

I have been buying your magazine regularly but so far I have not come across any games or educational programs for my new computer which is the Lynx. Has anyone out there got any programs for the Lynx? If so I'd love to see them!

### Truro, Comwall GENIE BEATS THE GLUTTON

Dear Sir,
I write to thank you for your
note about the Glutton
program and hasten to let
you know I have stumbled
across the trouble!

The Genie I has a ROM
which is enabled by a
SYSTEM call which amongst
other things cures the
keyboard bounce, provides a
M/C monitor etc.

By NOT enabling this: ROM the program RUNS ok and indeed two other programs I have had trouble with also run properly.

There is nothing in the Genie manual about this so I hope this will help other Genie users who have encountered the problem. Lionel R. Howe, Button-on-Trent.

COMPUTER & VIDEO GAMES 9

# COMPETITION COMPETITION COMPET

# CALLING ALL ARCADE CHAMPIONS

Have you ever been beyond the Scramble maze? Or seen the treasures of Tutankahmun? Perhaps you're a regular destroyer of the Zaxxon robot or a veteran of the fourth Donkey Kong screen.

If you're one of those intrepid few, for whom the arcade denizers hold no terror, then you should put your talents on show at our Best Arcade Player finals.

The championships start right here at the bottom of this page with a form to fill in your top score achieved on three machines. These forms will be appearing in Computer & Video Games for the

next two months and by June we should have some idea of who are the best arcade players around. Taitel Electronics, who have brought many of the current arcade favourites into the UK are helping us to organise a grand finals day with a OK so your name features all over the high score charts in the local arcade.

Well this form could take you into the big league with a crack at the

Best Arcade Player title for 1983.
Simply cut it out and take it along to the local pub or arcade where your favourite machine lurks, put on the best score you can and ask the arcade manager or pub owner to witness the score no this form

We'll need the name of the game, your score, where you achieved it and a date — plus your name and address of course.

But don't put all your eggs in one

basket. If there's another machine you fancy your chances on, use the top personality who also enjoys

next category to fill in your best score on that too.

And there's a place for a third machine too. Your chances of reaching the final may increase with the number of different games you enter on. Should you produce a bad score, just try again.

You may also find the leaflets on display in your local arcade. If you notch up a good score after forgetting to bring the leaflet out, ask the arcade manager whether he's got some you could use.

The entries must be back with us by June 13th and should be sent to: Best Arcade Player, Computer & Video Games, Durrant House, 8 Herbal Hill, London ECTR 5JB,

top personality who also enjoys tackling electronic adversaries.

Then we will invite all the top scorers on the most popular machines — which will be judged

purely on your response — along to show us what they can do and the best of these will be crowned the Best Arcade Player. A table-top arcade game is the prize for the winner and all the finalists will get an expenses-paid trip down to London to take part and probably see some of the latest arcade games around too.

Last year the finalists were joined by the national press and Steve Davis, the top snooker star who also proved himself a dab hand at arcade games by taking on our champ Peter Edmonds at the game of Qix and beating him.

# Please enter the following scores in your 1983 Video Games Championships

1983 VI	deo Games Chan	1pionships
My high score is:	My high score is:	My high score is:
It was scored on a:	It was scored on a:	It was scored on a:
Date: machi The manager of the pu arcade who witnessed n score is:	b/ The manager of the pub/	Date: machine The manager of the pub- arcade who witnessed my score is:
His signature: Name & address of pu arcade:		His signature: Name & address of pub/ arcade:
My name is:		

# TION COMPETITION COMPETITION CO



# Bally's American team of top pinball

designers are currently working out whether Alcatraz is likely to escape from their workshops.

Alcatraz is the brainchild of Andrew Muir of Grove Road, Norwich, who won the Bally Pinball design competition we featured in our September issue.

Andrew put the emphasis on skill with a barrier of drop targets which have to be knocked down to begin your escape path in an upper play-

Players are also given the chance to spell out "A-L-C-A-T-R-A-Z" in the lower playfield. His game also featured a captured ball and trying to get a ball through a moving hole.

The Bally judges were particularly impressed with the care and pinball knowledge Andrew displayed in his design.

Bally's US marketing vice-president Tom Nieman, was so impressed with the high standard of the entry he split the competition into two and awarded a second prize in fin of Lych Way, Woking, for his laws game.

Dave Adams of Bally UK entertained both winners at his Wembley HO last month and presented Ian with his Intellivision games centre and Andrew with a super Vector nintable to set up in his home in Norwich.

An additional bonus for Andrew came in the shape of The Pinball Owners' Association granting him free membership. And it turns out that our winner will be member number 1,000!

Runners-up in the Pinball design class: Alexander Martin of Hamilton Crescent. Brentwood and David Payne, of Seaton Gardens, Ruislip. In the video games design class

Ian Farrelly of Ouarry Road, Portishead came second and third equal were Peter King, of Church Lane, Walthamstow and Ian Rainford of Peel Hall, Wythenshawe. Free subscriptions to C&VG are on their way to this lucky few.

# Could you help Farmer Nure with

even!).

his blooming problem from our March issue?

If you worked out the plant's next bloom then you may find a Hungarian Ring Puzzle, destined to cause you further sleepless nights, on its way to you.

If not, this is the way to work out

the plant's next blossom. Each petal has "neighbours" with which it shares an edge line in our drawing

For any petal, if an even number of neighbours also have its own colour then it keeps that colour in the next generation (ves. O is

If an odd number of neighbours have its colour then it changes in the next generation in the sequence Blue to Red to White to Blue . . .

We may currently be micro-less but we're far from powerless. I personally claim responsibility for kidnapping the P9(1) from the end of line 2630 of the Book of Games' World Cup Manager program.

Nibblers fans with a Vic-20 can have their listing (January) improved by changing a few PEEKs and POKEs. A letter or a call to the C&VG offices will result in a copy of the necessary changes being put in the post.

Defuse gave Texas owners a difficult time after Screaming Foul-up ran riot in it. The following lines should be added or changed: 1110 R-RT

1120 C=CT 1130 CALL HCHAR(R.C.96) 700 C=RAN(28)+2

2590 CALL HCHAR(R.C+LASC (SEG\$.1+1.1)))

we published it as it serves as a t

domination it has not ever more compli-

No longer is there an abundance of undiscovered worlds, easily captured or destroyed by my rampaging fleets. Not every planet is hard won by diplomacy or

As a Begterker, I'm inclined to blow up ing upon creating an empire. Now that all my people and gain points quickly.

Doing this, I don't need any outside interference so I have tried to stay at peace with everyone. I am trading with a erchant and an artifact collector and so

far, have met only two hostile players. One of these, an apostle, refuses to answer any of my messages while an extremely insolent space pirate has recently captured one of my fleets. Unless he returns it, I will start a holy war, hoping

my many allies will join in to destroy him. Still the main problem is my unbelievably low galactic takeover rating. Just creeping over 100 points while other peo-

# spectrum

# NEWS

# from SPECTRUM

This proven and tested micro is now UPGRADED to 48K RAM and there's no increase in price either which must make it about the best value around.

ATARI 400
Now REDUCED by a MASSIVE £39 to

now REDUCED by a MASSIVE £39 to an incredible price of only £159.95 from Spectrum.

# SPECTRUM

We have now added the super SINCLAIR ZX SPECTRUM 16K and 48K Models to our range - check our

# NEW SPECTRUM

Check our address page! - there are many new SPECTRUM dealers throughout the UK so there's a good chance there'll be a SPECTRUM contra year page year.

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The general stock situation has now improved and you'll find that most SPECTRUM centres will be able to supply you immediately and at super LOW prices too!

INTRODUCING

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# NEW PRODUCTS NEW PRODUCTS NEW PRODUCTS NE

# TEDDY TAKES ON THE TROOPS

AH. DIDDUMS!

cute novelty game called Ah Diddums. There is more than a touch of Mary Poppins in this game where the goodies of the toy box team up against the baddies. You control a small teddy bear

armed with a pea-shooter and a supply of wellington boots which can be flung at the tin soldiers, a nasty train set, and various ugly shapes of plasticine - all of which are out to get poor Edward Rear

You have to fight off these nursery nasties before they knock the stuffing out of Teddy! Ah Diddums runs on the Sinclair Spectrum in 16 or 48K. The game is available by

mail order from Imagine Software of Liverpool and at some larger branches of W. H. Smiths

# **ADVENTURE** AND ACTION **FOR ORIC**

Bug Byte, Psion, Salam Quicksilva are some of the established software houses that have been signed up to write games for the new Oric computer which

has just gone on sale. The £100 machine which will compete directly with the Spectrum and will also have a range of names under Oric's own label. These will include Chess, Go, Adventure and Invaders.

Bug Byte will supply a text only adventure called The Castle, Salamander will produce Backgammon, 3D Maze, a Star Trektype game and an adventure, and Quicksilva are working on an original arcade style game. Other games listings will be published in the Oric owners

magazine which is to be published every two months. Computer and Video Games will also be publishing a professionally written game for the Oric in our June issue.

tures of the real game Each hole is displayed as play-



# **GFT DUG IN** TO BEAT THE MONSTERS

APPLE PANIC

Creative Software titles coming into the UK from America include Apple Panic, a game in which you must dig holes to trap the Apple monsters that are pursuing your little man.

Serpentine introduces snakes and frons into the maze chase style game. In order to survive you have to avoid or devour the hostile red serpents. If you do, you can lay eggs and hatch baby enakas

The games are sold in the UK by Audiogenic of Berkshire and are in the shoos now at £24.95.

# **WATCH THE BIRDIE ON** A DRAGON!

DRAGON GOLF

If it's too wet for your Saturday morning round of golf and you can't face the weekend without it then relax as you may still be able to get a hole in one with this latest golf simulation for the Dragon.

Dragon Golf is a nine hole golf course incorporating many fea-

ed including all bunkers, water

wind strengths and directions play an important part in the match as well as ensuring that each hole plays differently, even if the same clubs are selected by each player

You can select from a full range of clubs including woods, irons, and putters and can chose the angle of shot and the strength of stroke as you aim for

a hole in one Dragon Golf is available from Reading-based Audiogenic on tape at £5.00.

# **ESCAPE FROM** THE PLANET OF DANGER

ORION

Escape from Orion is a new BBC space game incorporating some of the features of the popular arcade game Donkey Kong.

Your flying saucer is moved backwards and forwards with the joystick and hops by depressing the fire button. Four screens of progressive difficulty must be negotiated with

a bonus score for each screen successfully completed As you proceed your ship must hop up to collect resources you need for the voyage: fuel rods,

tools, water, oxygen. Escape from Orion runs on the BBC model B and is available at £6.75 inclusive from Hopesoft of Berkshire.

# WATCH OUT THERE'S A MINE ABOUT!

MINED OUT

are treading in Quicksilva's latest Mined Out challenges you to

get safely across a field which is riddled with enemy mines. Put one foot in the wrong place and you'll be blown to bits. To aid you in this perilous

jaunt you are given a mine detector and some safe areas around the edges of the mine field where you can walk unharmed

To add interest the fields are inhabited by a couple of hostile creatures: bugs and mine spreaders. Watch your step! Mined Out is for the 48K Spectrum only and is in the shops now

at F4 95 ZX81 owners have also been included in this month's new releases from Quicksilva with three 16K games based on well known

arcade money spinners. Kroka Crawla is a version of Frogger, Munchies is a maze gobbling game similar to Pacman, and there is also a Galaxians with an extra bonus game on the same tape called Gloops. Kroka Crawla and Munchies will sell for £3.95 and Galaxians is a little dearer at £4.95



# W PRODUCTS NEW PRODUCTS NEW PRODUCTS NEV

# **SEARCH FOR PRICELESS GOLD FLEECE**

# ARGONAUTS

Dragon owners may encounter a few dragons of the fire-breathing variety when they team up with Joseph and the Argonauts in the search for the golden fleece. This priceless treasure is hid-

den on one of the numerous islands which are scattered throughout the seemingly endless seas which your battered ship must navigate.

As well as dangerous encounters with sea serpents, storms, vellow fever and the plaque, you are constantly dogged by a thick mist which can cause you to go wildly off course.

You have a limited amount of fuel and food to last the voyage. This is randomly decided by the computer each time you play. Joseph and the Argonauts is a

nart text and part graphics adventure. The game is the latest addition to the range of games from Item Limited for the Dragon home computer. It is available from the Berkshire-based firm at

# SUPERSTORE **NEEDS A** SUPER 'TEC

# SNATCHER

If you have ever wondered exactly what your boss thinks of you then you will be left in no doubt when you play Catch a Snatcher on the unexpanded Vic.

Your popularity rating with the hoss is displayed as a constantly changing percentage, depending on your performance.

You are a store detective patrolling a large department store. Shoplifters, lost children, lost property, lost dogs, and even a terrorist bomb must all be dealt with by you - the dilligent security officer

Escort a stray dog out of the food hall and your popularity rating goes up but let a thief get away with a portable telly and it falls straight back down again.



cent and, if you go above the ninety nine percent mark, you progress on to a new but more difficult floor. The game is available by mail order from Imagine Software of Liverpool and larger branches of W. H. Smith at £5.50.

# SCRAMBI ING WITH THE INVADERS

## **ARCADIA**

Two hit arcade games on one tape is the latest offering from the well established Sinclair software house - J. K. Grey

Scramble and Invaders are the titles from the arcades with another two giveaway games

thrown in for good measure. Arcadia is the name of the amos nack and it runs on the inclair Spectrum in 16 and 48K. It is available at £4.95 from the Bath-based firm.

# **RETURN TO** THE WORLD OF ZORK

# 70RK III

dventure fans will need no introduction to the Zork tales which are becoming as popular in the U.S. as the classic Scott Adams adventures.

If you managed to get to the Stone Barrow in Zork, and became Master of the Domain, having defeated the senile Wizard of Frobozz in Zork II, then you will be anxious to enjoy the action of

Zork III starts with you placed at the bottom of a long staircase At the end of the staircase is the Treasure Room filled with all the treasures of Zork The conclusion has an un

usual twist, although you will need to use an equally unusual approach to get that far. Zork I. II. and III are available. on disc only, for the Apple and Atari computers.

The Atari versions are available from Calisto Computers of Birmingham at £30 each and the Annle versions from Pete and Pam Computers of Rossendale. Lancashire at £25.95

# MONKEY RUSINESS WITH KONG!

# KRAZY KONG

What do you get if you take a gorilla, a blond starlet, and a mad carpenter called Mario. Correct - you got it in one, it's Donkey Kong! More accurately, it's Krazy Kong, in this new version of the hit arcade game for the 16K ZX81. The game has three screen

presentations with tumbling barrels, money bags and lifts. It is available from Personal Software Services of Coventry at £3.95, including postage and packing. Spectrum owners have also been included in the new releases from PSS with a scrolling maze game. The idea of Maze Death Race is to escape from an

enormous maze before the evil

cars run you down. Maze Death

Race is available at £4.95.

# **UNDER MY** SKIN!

# MANGROVE

Beneath the surface of your skin a major hattle is being fought!

On one side are the massed ranks of cells that cluster together in groups of four, in defensive formation to withstand the onslaught from the attacking

Until recently you would have needed an extremely powerful microscope to witness this fantastic battle. But now you can not only see the action on your screen but you can actually take part yourself fighting the good fight against the disease bringing microbes, in Mangrove, an original game from Supersoft.

Move around the screen using the joystick depositing cells as you travel. Only cells in groups of four can survive.

To heat off the microbes you are armed with three smart hombs which will kill off all the microbes on the screen.

Points are awarded for each cell deposited and these are counted up on the sixth beat of the heart which pumps continuously throughout the game. Every five thousand points there is a microbe storm so you had better keep a smart bomb or

two in reserve Mangrove runs on a Commodore Pet and is available at £8 from Supersoft of Harrow with Vic-20 and Commodore 64 versions in the pipeline from Audiogenic Ltd of Reading.

# NEW PRODUCTS NEW PRODUCTS NEW PRODUCT

# **SPLICE THE** MAINBRACE, **LANDLUBBERS**

think flying is for the birds a Dublin software company suggests you try your hand at sail-

With Sailing Simulator you are in charge of a 50 foot sailing yacht with a screen split into two halves. The top half devoted to an instrument display and the bottom half showing a map.

The display gives the level of heel of the boat, or whether you are likely to ship water. There is a profile of the ship showing the amount of sail, a control for the anchor, a picture of the hoat from above which shows where the wind is coming from and a compass heading

Your five controls feature port and starboard, increasing and reducing sail and finally the anchor. While a text display gives the weather forecast.

Your job is to navigate into three imaginary ports which vary in difficulty. When approaching land the map changes to show the coastal charts and you must take care not to run aground. The weather is also a product of the programmer's imagination but mainly moderate - although you may find yourself up against a hurricane or a high swell.

The game runs on a 48K Spectrum and costs about £5 from Soft Options of Castle Nock, Co.

# DON'T DRINK AND JUMP THE ROAD!

Sharp MZ-80K owners are in for a bumper choice of games from a new range just on sale.

Dare-Devil is based on the popular arcade game Frogger though instead of getting a frog safely to the spawning grounds Plonker and Trap. you are charged with the far more-important task of getting available from Remus Software



to the pub. Could be thirsty work! Encounter challenges you to stop a Martian spaceship landing on planet earth The third original game on

Games Pack Four is Railroad where you control several trains on a network railway. Switch the points quickly to stop them crashing Pontoon and Pinhall are also included.

Three simulations are the main attractions on Games Pack Five which enable you to drive a car. fly a plane, and command a fleet in the mid-Atlantic sea battles of World War Two. Noughts and Crosses and a maze chase game are also featured

Games Pack Six offers a 23K adventure called Lost in the Jungle which challenges you to find your way back to civilisation and overcome attacks from wild beasts you will encounter on your way. This is a part text and part graphics adventure

If you fancy becoming a Wizard and attempting to cast a spell on an unruly dragon then Games Pack Seven may be more your cup of tea. This cassette also features Air Attack - an air sea battle in which you command a warship, Take Away which is a version of Solitaire. and two original games called

The Games Pack range are all the dare-devils across the road of Manchester, at £6 each.

# WHO WANTS TO BE A MILLIONAIRE? MONOPOLE

Monopoly - that famous Warldingtons board game has been converted for play on your home computer

This should enable you to avoid having to use a thimble or twenty pence piece when your favourite boot or too hat has been lost and the 500 pound notes and title deeds to Mayfair and Park Lane have been chewed up by the cat

No harm can come to the nieces in computer Monoply as everything you need to play is safely stored away on cassette. Monopole - with an 'e' not a

y' presumably to avoid copyright problems - runs on the Commodore 64 and costs £9.99 from Babbit Software of Harrow Commodore 64 owners can also look forward to a range of

adventure games to play. The first three games on Adventure Pack 1 are Moonbase Alpha, Big Bad Wolf, and Computer Adventure, Adventure Pack 2 will follow shortly with a graphic Adventure called Grave Robbers. These will also be available

at £9.99.

# THIS GREAT LITTLE MOVER!

PHANTOM CHESS

machine is a great little mover Not only does it play to a good standard but it needs no manual help in advancing pawns, leaning knights are castling. It's all done by magnets.

It will quite happily play itself And then set out the pieces again for another game. It has 12 game levels and

comes with a booklet showing the rudiments of chess for a complete beginner. It further helps beginners by analysing their next move for them

The game is marketed by Milton Bradley and sells for around £300. It is set in a large black

The knight is moved by clearing a path past the intervening pawns and taken pieces are moved off-board onto two strips with the appropriate symbols.

If a human player hopes to take on the machine it responds as a sensory board and also plays a good range of openings.

# **BLAST THOSE**

Two new shoot 'em up games

are on offer from Mikro-Gen. Scramble is a version of the now famous scrolling arcade game where you have to fly over an uneven landscape, bombing fuel dumps and shooting down aliens, whilst dodging fireballs and ground to air missiles.

Cosmic Raiders is a version of Defender, the toughest of all arcade games. You fly a ship over a planet's uneven terrain, protecting humanoids from the Landers and the Grabbers.

Scramble and Cosmic Raiders run on the Spectrum in 16 or 48K and are available from the Bracknell firm at £5.50 plus 40p postage and packing

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# **IMAGIC DEMON FACES NEW ONSI ALIGHT**

## LEGAL ATTACK

Established top seller Demon Attack is coming under fire in the US courts for being too similar to a cartridge Atari have still to bring out.

Atari-compatible cartridge producers, Imagic launched their range with the space game, Demon Attack. It is a top seller, both here and in the U.S. and recently became 1982 home video game of the year

Atari claims that the cartridge is a copy of Pheonix which they are planning to release in home video form under licence from Centuri.

The notion of post-dated convright is explained by Atari chairman Ray Kassar in the U.S. trade magazine Play Meter: "The relative success of Demon Attack in the market confirms to us the number of avid Pheonix fans who are buying Demon

Attack to play Pheonix "With Atari's introduction of the authentic game, the presence of Demon Attack in the marketnlace is confusing to the

consumer." Atari hones to win an injunction against further sales of the game. The U.S. giant is also seeking an injunction against Colecovision Atari Expansion Module which will allow Colecovision owners to play Atari software on their machine



cause its Burger Time. A nice thick 'n' juicy quarter

pounder with all the trimmings is enough to satisfy the largest of appetites and also provide hours of scrumotious entertainment on your Atari VCS

It's based on the hit arrade game and you play the harassed chef running through the multi storey maze trying to assemble the ingredients for your super-The good guys in this culinary

and the pepper - but watch out for the menacing sausages who have legs and are out to get your little chef, the pickles too can spoil your burger

The way to deal with these them by dropping burgers on them or stun them with a quick shake of the pepper pot. When you have assembled your burger you can go on to the next wave

Burger Time is one of the new M Network of games from Mattel, the makers of the Intellivision machine, for the Atari VCS. The games are due to go on

sale in the 'late spring' or 'early summer' although delivery dates are notoriously flexible in the video games business. If we are not too certain about

the "when" of these names we at least know a little hit more about the "how much" and there is some good news to report

Mattel are set to raise the competition's evebrows with prices starting as low as £10.95 and going up to £19.95.

Other highlights of the M Network include versions of the hit Intellivision games Lock n'Chase. Tron Deadly Discs, Advanced Dungeons and Dragons and Star Strike.

Competition for Atari's Soccer cartridge is provided by Internascrolls up and down the screen. Two space shoot outs are featured in the shape of Space

Loco-Motion challennes you to frenziedly build a rail system before the train arrives and

crashes killing the passengers. Six original games written just for the M Network include Dark Cavern, a Berzerk type game, the Adventures of Tron a classic adventure game called In Search



caper are the seeded buns, the ICK-AXE PETE HUNTS FOR GOLD PHILIPS G700 VIDEOPACS

Philips G700 owners can look dangerous habit of disappearing forward to two new Videopacs from time to time. Pete and a new chess challenge.

it rich in the Misty Mountains. There's gold in them than hills and Pete intends to be the man

You can join him on his adventure as he seeks the gold through locked doors, and climb- keving in the co-ordinates of ing up ladders which have the your moves.

Chess fans have also been included in this months releases turing en passant etc. If you Pick Axe Pete hopes to strike with six skill level chess chal- make an illegal move, the com-

One of the six levels is a simulation of tournament chess. The computer imposes a time limit for its moves. An interesting feature is that you can follow the leaping over bouncing boulders, thinking process of the computer finding hidden keys to get on your screen. You play by

all the major rules of chess, including castling, promotion, cap-

puter will refuse to execute it. Other good news for Philips games fans is that the big American manufacturer Imagic are about to launch two of their best selling titles - Demon Attack and

Atlantis for the G7000. Prices have yet to be confirmed, the games will be in the shops before the end of April.

game for two players called Armor Ambush, Frogs and Flies - similar to the Intellivision game Frog Bog, Air Raiders and Computer Revenge, in which you defend Earth from a barrage of

Intellivision owners will also be able to play Burger Time as Mattel are producing a version of the game for their own machine which will go on sale in the U.S. later this year.

This will also eventually be available in the UK though probably not until the end of the vear.

# CENTRES TV GAMES CENTRES TV GAMES CENTRES

# VIDEO REVOLUTIONARY

### VECTREX

The first "all in one" video games UK. Called the Vectrex it is manufactured by giant U.S. toy firm Milton Bradley, the people who brought you Dark Tower and Big-Trak

which comes with the more usual games consol — so you don't need a TV to play.

The monitor is small and nicely designed, with a nine inch screen. Compact, with an absence of wires and leads, the Vectrex takes its name from the display system incorporated in some arcade games like Asternids and Temnest

This graphics system represents all shapes as geometrical line drawings which shine out of the screen very brightly.

This means the Vectrex ver system is about to go on sale the sion of Asteroids - which is called Mine Storm - is a most accurate simulation of the arcade original.

Although this is fine for Asteroids fans like myself the graphics The machine's main selling system is very limited when it point is the TV style monitor comes to representing other types of games.

Hyper-chase for example which is a scrolling screen car chase game, had very unconvincing graphics compared with and Colecovision

Again on the minus side, the Vectrex only has black and white screen displays although transparent screen-overlays are supplied with each game to simulate colour - none too effectively in my opinion.

Although some of the names had disappointing well. Vectrex Scramble recreates all the addictiveness of this popular arcade game with authentic sound effects.

Rin-Off is a gem of a game incorporating some elements of Defender You natrol a hexagon shaped space sector containing several diamond-shaped ships which the aliens attempt to dash in and steal. I played this one for over an hour!

A very neat arcade style controller is a strong point of the Vectrex. A responsive, if a little bit small, the joystick is mounted on a plinth with four buttons for



other movement and, of course, available for the Vectrex by the

end of 1983.

these as yet

fire commands. The Vectrex will go on sale in

May at around the £140 mark. You get the Mine Storm game as an added bonus. The company is currently

negotiating with high street shops Dixons and Greens so you won't have to travel far to buy one! Twelve games will be available at £19.95 each.

About 30 cartridges will be yet.

Atari VCS 1 Pacman Atari VCS 2 Detender Atari VCS 3 Space Invaders Atari VCS 4 Starmaster Atari VCS 5 Frogger Atari VCS 6 Demon Attack Atari VCS Star Raiders 8 Empire Strikes

Back 9 Berzerk

10 Pitfall

Atari VCS Atari VCS Atari VCS Atari Activision Parker Brothers Imagic Atari

As well as new games these

releases will also include some

educational cartridges although

The news is not quite so good

on the independent software

front as people like Imagic and Activision have not announced

plans to support the Vectrex as

Atari

Parker Brothers Atari

# MORE ON THE STICKS POINTMASTER

The Discwasher Pointmaster is the latest addition to the bewildering range of gourmet joy sticks now coming into the U.K. I was slightly out off by the flimsy plastic construction of the stick. I couldn't imagine it standing up to my bad tempered style of play - being thrust down in anger when I lose my last Pacman ten points away from my

However, for responsiveness the stick scored as highly as kit.

high score.

in last month's C&VG tests. The fire button was sharp but a little heavy, clicking unnecessarily every time you released a

Pricewise the Pointmaster is a good buy, retailing at £14.95 - a good ten pounds cheaper than the Wico sticks.

New products in the pipeline from Discwasher include a rapid fire button, an up graded Pointmaster, a software disc-drive and cassette recorder cleaning

# For the best hardware, the best software.

The BBC Microcomputer system is generally regarded to be the best micro in its price range you can lay your hands on. So. if you're thinking of buying one or already own one, you'll want to know about the software that's been specially designed for it.

Not surprisingly, it's made by Acornsoft, the software division of Acorn Computers Ltd., who designed and built the BBC Microcomputer. So naturally you can expect the highest quality software with the built-in ingenuity to fully exploit the BBC Micro's potential.

Further education for everyone.

Tree of Knowledge (£9.95) is an interactive program for children of all ages teaching categorisation. It illustrates some of the more practical aspects of computing in that the pupil first educates the computer, building up a database by answering the computer's questions, and the database is then used to play games of deduction and logic.

Word Hunt (£11.90) is a set of four programs, each containing a list of nine words. The object of the exercise is to select one word and then try to create as many smaller words as





possible from the selected word.

Increase your business acumen.
Graphs and Charts (price £17.45) which includes the book 'Graphs and Charts on the BBC Microcomputer' contains a set of programs





to present data graphically in a wide range of applications. The graphs include automatic scaling, labelling of axes and use of colours.

And VIEW (price £59.80) a program that enables your machine, together with a printer, to operate as a fully operational word processor. For convenience the program is in ROM so that it can become a permanent feature of your machine. (It can easily be fitted by your local dealer). You'll find out more by going to your dealer or by sending for the free catalogue.

Mind-boggling games.
Castle of Riddles price \$29.95)
is a magical adventure, with wizardry
and hocus pocus of all kinds;
booby traps and frendish riddles
to be unravelled along the tortuous route to the Magic Ring of
Power. Your reward is to keep the

ACORNSEFT GAMES

Castle of Riddles

Castle of Riddles



treasure you find along the way.

Meteors (price £9.95) is a game where you have to manoeuvre your laser-ship through a hail of meteors, smashing them with your laser bolts as they hurtle towards you on all sides. Complete with sound effects and table of Hi-Scores.

against invading aliens. The only way to resist and avoid subsequent annihilation is to destroy the aliens before they land. You have three mobile launchers whose hyper-velocity missiles will instantly vaporise their target on impact. This game includes high-score, and is fully compatible with either keyboard or joysticks.

Understanding computers.

Pecko-Computer (price £995) simulates the operation of a simplified microcomputer in order to teach the fundamentals of machinecode programming. It comes complete with a 16 page instruction manual including exercises and examples, and the cassette features five demonstration Pecko-Computer programs.



# ACORNSOFT GAMES Super Invaders

How to get Acornsoft programs.

If you're a credit card holder and would like to buy cassettes of the programs shown in this advertisement, or if you would like to know the address of your nearest stockist, just phone 01-200 0200.

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# Dragon's Lair

I thought it would be easy... explore the Dragon's Lair and find the Crystal of Power with which to destroy him. But I didn't count on the dangers that confronted me. There were others in that mind boggling maze too! The utlimate 3D Maze Adventure for the 48k ZX Soectrum.

# Anust

It's taken America by storm — now its available for your ZX Spectrum! In this amazing new arcade game you Joust with the Dark Lords in an other worldly setting. Quite amazing animation as you fly your Ostrich by controlling the flap of its wings!

### MONSTERS IN HELL

It was like a nightmare. Trapped in Hell, the all consuming flames below me, running flames below me, running from the Vampire monsters through a maze of platforms and ladders. I had Holy Power on my side, though, and could survive if I replenished it frequently. And the only way to kill them was to make them fall through holes I created with my hammer. But them the Mad Monk sent his ghouls after me. .. Any ZX Spectrum.

### MILLIPEDE

Milli the Millipede seemed indestructable; no matter how much of her body I shot away she kept coming! But then Sid the Spider appeared from nowhere, and Scorpi zoomed across dropping her indestructable fleas on mel A quite astounding version of the arcade favourite. ES-9.

### **COSMIC SWARM**

OK, I accept I'm to blame. I disregarded orders and entered the Altair sector. Eggs, eggs everywhere — I shoot, two fantastical alien types appear whose touch is deally They join, seemingly by chance, into a mutant which chases me! Probably the most original new space 'shoot-em-up' game to appear. Any ZX Spectrum.

### **FIREBIRDS**

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**ZX SPECTRUM SOFTWARE** 

# CHESS

Artificial Intelligence research is closely linked to chess programming in trying to help computers think like we do.

to help computers mink may we ou-Researchers at Edinburgh University have subjected the King and Rook against King and Knight ending to detailed analysis to try and come up with a database giving the result and best move in every legal position.

Grandmasters usually believe the ending to be a draw but it is so complicated to play that in practice this is seldom

the case.

King and Rook versus King and Knight endings (KRKN) would seem to be impossible task for the programmer trying to give his computer the best option

to give his every time.

At first sight, generating such a database is a hopeless task. Assuming that each player has an average of 10 moves in every position, there would be over 10 to the power 50 different variations to consider (up to the end of the game) before deciding on the best move in some positions.

some positoris.

However, the amount of computation involved can be hugely reduced by well-established trick. This involves generated by a consistent of the properties of the properties which are by working backwards from terminal wins—checkmates. All positions who generated by this process are drawn, except for a few positions where the Knight gives checkmate for Black!

As an example, figure 1 shows Black to move, checkmated or, in the jargon, lost at depth zero.

Incidentally, it is helpful fiction to consider positions where White has just taken Black's Knight without leaving the Rook en prise or giving stalemate as "checkmates". Any position from which White to move can lecally play figure 1

one). Figure 2 is such a position with White Figure 2 is such a position with White can now choose to to move, since White can now choose to palay R-QR mank. Generating pail check-mate positions (Black to move) is reasonable straightforward. Retracting every (legal) White nover from each of white control of the second of the second part of the second pa

Now consider reversing every possible last Black move in figure 2. Supposing Black last played his Knight from KN5 to KN3, then the previous position

was figure 3.

Checking every legal Black move from this position reveals that each one plays to a lost in one ply position (such as figure 2 or figure 4).

Hence, figure 3 can be classified as

lost in two ply with Black to move. Working backwards a further step shows that figure 5 (with White to move) is a win for White in three ply, since White can choose to play R-QNZ giving

White can choose to play R-QNZ giving figure 3.

Continuing in this way (with a few embellishments) eventually produced the desired list of all won positions, together with the depth of the longest

winning variation and the best move for the side to move.

What makes the algorithm almost unworkable in practice is the huge number of possible positions even with only

four pieces on the board.

Fortunately, the number can be greatly reduced making use of symmetry.

For example, figure 6 is the same as figure 8 symmetrically, if the latter is imagined reflected about a vertical line between the two middle files of the

Working at Bell Laboratories, Ken Thompson (the inventor of BELLE) has produced a database giving the necessary information for the 651,492 of these positions which are wins with White to move.

Thompson has also produced a table showing the number of won positions for White (to move) where it takes 1, 2, 3 . . . moves to give checkmate (or safely

take the Knight

There are 378,518 essentially different mates in one, allowing for symmetry, 95,450 mates in two and so on down to the deepest wins of all: two positions where White moves in 27 moves (53 plv).

moves (53 ply).

For the record, these two positions are: a) WK on QR6, WR on KR3, BK on OBL. BN on QN5, and b) WK on Q8, WR

on KR8, BK on QN1, BN on KN4.

By using Thompson's database, it is



Hence, figure 6 must also be a win for White in three ply. It turns out that it is only necessary to

consider positions with the Black King on one of a set of 10 squares, such as QR1, QN1, QB1, Q1, QN2, QB2, Q2, QB3, Q3, Q4. Moreover, there are only 462 legal

King configurations with the Black King restricted to this triangle of squares (deleting cases where the two Kings are adjacent or on top of one another).

This allows the number of positions it

adjacent or on top of one another).

This allows the number of positions it is necessary to consider to be reduced to 462 x 64 x 64 = 1,832,352 with each side to move, many of which are illegal because of the position of the Rook or Knidth. All other positions are equiva-

lent to these by symmetry.

This is still a large number of course but manageable with a large computer.

possible to find the best move in every winnable KRKN position — a remarkable achievement, yet profoundly dissatisfying.

The problem is solved but in a form

which no human could possibly remember or understand.

The natural question to ask is whether

the content of this huge database could be simplified down to a relatively few rules of play of the kind usually found in textbooks:

If it could, the resulting rules would have the merits of high precision (rather than the general advice, such as "ry to separate the King and Knight" given in books) and quaranteed reliability.

Recent research has concentrated on synthesising just such rules, in a form which human chess players find is meaningful. I will return to this topic in a future article.

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WHSMITH W





# BUG-BYTE SOFTWARE, MORE THAN A GAME ...IT'S A DOOR TO ANOTHER DIMENSION!

All about me was darkness. Tens of thousands of screens stared blankly into space. Minds drifted aimlessly, dulled by lack of stimulation. The world was grey, drab, lacking...

Then suddenly it happened. First one, then another, then tens, hundreds, thousands of fired screens felt a surge of power and flickered back into life. They were much as I had seen on my own planet's microcomputers – the ZX 81, YX Spectrum Vir ZA BBC Micro and ORIC-1.

The minds paused to take stock. They clustered round the screens, their nimble fingers excitedly flicking the controls back and forth. At last they had found a challenge... oction

and adventure with curning tests of dexterity and reaction. Everywhere, conversation was of Asteroids, Mazogs, Panic, Another Vic in the Wall.

Unable to resist, I too had a closer Jook. There before me was vivid colour, high resolution graphics. I could practically feel the spine-tingling sound effects as whole battle fleets of Cosmiads swarmed out of nowhere and attacked. I should have known. As my finears praced over the controls, and I prepared to the property of the controls, and I prepared to the property of the controls, and I prepared to the property of the controls, and I prepared to the property of proper

to stand and fight with only a single laser bolt for protection, I realised I was trapped! Too late now, I remembered this was no ordinary software. I'd been warned, as I now warn anyone buying from Laskys, WH Smith, Currys Micro C, Spectrum and larger branches of Boots, and a nationwide network of dealers stocking Bug-Byte Because Bug-Byte is more than a game, if s a door to another dimension. One that I had opened



100 The Albany, Old Hall Street, Liverpool L3 3AB

# FOUR GAMES IN ONE

Baby Pac-Man leads you where

no other video game or pinball has none before!

So says the publicity material from Rally about their latest haby - an out and out arcade mutant! At first glance this latest addition to the Pac-Family looks like

an upright video cabinet - then you notice that there's a pinball playfield grafted on to the bottom. You get two flipper buttons either on top or on the cabinet sides, just like a regular pin, plus a joystick controller for the viden-maze

Game action starts off in the Pacman maze with Pac-Baby munching his way around controlled by the stick. But there are no energisers to help fight the deadly chosts. You must escape through the out-tunnels which you earn the energisers and

valuable fruits to enable you to

score in the video-maze. Spelling PACMAN by hitting drop targets earns you one energiser. Hitting the Hoop Loop ball spots earns you more. Spell FRUITS by hitting more targets and you get one of eight fruits. Spell TUNNEL and you'll increase your Pac-speed through

You get back into the maze by dropping your ball into one of the playfield's two saucers or when your ball drains away. Hitting the route to the playfield - but the 'drain" closes the escapes and

you'll have to beat the maze or be eaten to gain freedom of the You can earn an extra Baby by lighting up the centre arrows on the pinball playfield. The game begins and ends in the videomaze and you get three lives to

play with. It's yet another interesting innovation from Bally, and has been going down well in the U.S. and at trade fairs in this country Watch out for it!

- the video game were spoilt for total at 50 points a bug choice in deciding what action to feature.

They got around the problem by offering four games in one. Each wave of Tron offers a challenge on every game. Two of these test reaction and coordination and two pattern-learn-

ing and recognition. You can tackle the four games in any order but must go through all of them before starting a

second wave. A beginner should start with the easiest screen - which also offers the most points - Grid Rugs These computerised spidhe can reach the transporter. ich will take him on to the

There is a time limit on this but e Walt Disney movie use it all until the warning note to work on, the designers of Tron sounds and you should net a nice

On wave one immediately blast your way to gain a position in front of a side entrance. On wave two, kill bugs directly

above you before moving to the side entrance. Wave three should be dealt with by moving to one side of the

transporter and firing down on the bugs. Wave four comes in a figure "2" and Tron should escape right and up diagonally and blast through to the transporter's right entrance.

Wave five surrounds Tron with bugs. Fire to right as soon as they appear and escape in that

The MCP Cone has to be blasted through while it descends upon you. Rise up through the cone firing continuously and touch you, you will be de-rezzed You score 1,000 points for en the blocks and a further thousand is available for clearing all blocks.

Advanced cone waves are made more difficult as the speed of rotation and speed of descent

Light cycle screens are really a question of experimentation to get the right pattern to survive while the yellow light cycles des-

This is similar to the nonular computer game of Surround, except that you control your speed Use a fast burst on the trigger early on to set up your pattern and then slow down to avoid destruction while the enemy cycles crash.

Remember that the enemy cycles react to your movement, so you will give the same results every time. Push joystick and see the screen. Then you know you are the right route for each

The tanks screen is difficult with each enemy tank needing to Your advantages lie in rapid fire and rebounding shots off the walls of the maze - plus a chance to learn from your mis-

Again get in the habit of pushing off full throttle as soon as the screen starts and memorise patterns. All patterns once learnt and practised can be re-



command in Tac-Scan and a deadly evil galactic empire is the

Seven ships must be manneuvred in the battles with the empire's own Annihilators and Stinger craft as laser beams flash across space.

A space warp tunnel will fling you into new areas of the galaxy and marvellous blue graphics on a black background, plus a real feel for perspective make this game more than just another space conflict.

Annihilators attack with rocket while your Tac-Scan fighters can problems and challenges.

squadron is depleted. This is achieved by pushing the Add

Ship button or docking with additional ships which occasionally appear on the screen. Manufacturers Sega claim More than 1,300 realistic space

It's certainly light years from the sort of space conflict, the invaders offered and controlling a squadron, as opposed to just fire, Stingers aim lethal lasers one craft offers new scope





# **MEETING A STICKY END**

# ANTEATER

er collects termites by probing through their tunnels with his long sticky tongue. Most of these odd animals seem to thrive on this method of dining out - but there are hidden danoers below the surface which wary anteaters should watch out eaten from behind.

This particular breed of ants are swallowed easily enough when approached in the right manner - but should they happen upon anything other than the end of the anteater's tongue they passages and keep a wary eye will just chomp their way through

You play the anteater in this tract button for rushing back to defend against danger nearer Your animal stands by an ant-

through a network of passages. Other worries which live in these tunnels are worm which inch their way along carrying a noxious substance on their heads. These can only be

Right at the bottom of the screen are the queen ants

These must be gobbled to kill all ants in the passageways. While you are busy gobbling, watch out for ants anninaching along side out for worms. And beware, daylight is fading and the dreaded spiders will soon be out! These will travel down your

tongue on finding it and prevent retraction. When a spider is on your tongue, it's hell-for-leather down to the queen ants to try and save yourself.

# DRIVE FOR REALISM

# POLE POSITION

exhilarating driving simulation game on the market

Turbo featured better landscapes in its driving action but it can't match the speed, thrills and

skill behind this new race game. Your car is shown in front of you on the racetrack as you begin a qualifying lap. The countdown starts as soon as the lights flash, and away you go in first pear to try and beat the clock.

There are a few other drivers out to qualify as well and these may have to be overtaken at the

Cars turning corners are shown in every graphic detail of the manoeuvre. You must avoid them and the road signs or crash. Taking corners too quickly

will result in you losing control of the car Skidding off the track. crashing or hitting oil puddles elow you down

A time below 73 seconds will put your car into the race proper and your starting grid position depends on that time Jostling with the other cars in

the race, you must also take on the clock to notch a top time on the machine. An accelerator pedal, two

gears and a steering wheel are your controls in this game which comes in stand-up cabinet and cocknit design

Time, score, lap and speed are shown on screen No unnecessary frills but the plain graphics are sophisticated and believable and trying to hold a screaming curve or overtake, offers thrills to compare with the real racetrack

The lovable Q\*bert begins to play on top of a 3D pyramid of brightly topped America's video games

The game theme is obvious and its simplicity makes it all the more infuriating when Q\*bert's mission ends abruptly.

With big eyes, a hollow-tube of a nose and not much else, Q\*bert hops down his pyramid changing the colour of every block he lands on. When every

block has been changed, the little creature hops off to start a new screen with a new pyramid.

The task is made more complicated by a series of bouncing characters who follow Q\*bert down the ovramid dislodging him if they meet. There is also a deadly snake called Coily who will follow our hero back up the screen and try to squash or bite

Coily comes down screen as a grape shape, pauses and sets off on O\*hert's trail. To escape Coily, Q\*bert must make use of two flying discs beside the pyramid A well-timed leap onto one of these will return Q\*bert to the pyramid top while sending Coily leaping off into space and instant

Subsequent levels require O\*bert to change the grid to first the object colour, by two leaps on every cube. There are nine levels in all and

the diagonal leaps are achieved by a four-way joystick It can be played by one or two

people. Q\*bert seems to be an appealing creature, despite his habit of swearing a good deal, the graphics and colours are bright and extra Q\*berts can be won for scores ranging from 6,000 to 11,000. The machine operator sets the level.

# **BOARD WITH ARCADES?** BOARD GAMES

# Just when we were used to

seeing our arcade heroes turning up in TV games centres, gamewatches, even movies, they have heen launched in a new medium.

Now you can play Pacman the board game. A range of six arcade board games has been launched by Milton Bradley and Frogger and Donkey Kong

A large board covered in peads is inhabited by four colourful plastic gobblers whose jaw mechanism allows them to swallow every bead they land on. Two ghosts also wander the board, trying to catch the Pacmen and retrieve the beads. Going over an energiser bead

allows you to catch and eat the ghosts, sending them back to their home at the centre of the board When all the beads have been

eaten, the Pacman with most in his tray is the winner. Energiser beads, four tunnels and of course, dice also feature in this simple recreation of arcade gluttony - but I couldn't see any

Donkey Kong is also for four players, while Frogger challenges two players to be first across the road and river.

The games retail at around £9 and the series will be added to soon by Berserk, Defender and the 3D thrills of Zaxxon.

COMPUTER & VIDEO GAMES 31

VAST landlubbers! This here's a tale of high adventure on the high seas in the time of Lord Nelson and his famous fleet. Splice the mainbrace and set sail for an encounter of the salty kind with the scurvy seadogs of the Spanish navy.

Battle commences when the English ships of the line meet the Spaniards. English ships are shown on the right of the screen as inverse W, X, Y, and Z. The Spaniards are represented by inverse A.

B. C and D.

The border around the playing area is marked out by x's which represent rocks and the graphic '+' represents wrecks. If you hit the border or a wreck then your ship will

sink. When a ship is hit by gunfire it gets a damage rating. Any ship sustaining a damage factor of more than seven can only move one space at a time in the direction required. When a ship's damage factor reaches more than nine it will sink. The wind direction -

which governs the move-



change at random. A ship played at the bottom of than at a tangent to it.

cannot move against the the screen during play. wind and will travel For example; what ship to further with the wind move, damage factor for a ship etc. Some instructions and

using key '9'. Each ship in turn can fire before moving. Fire is always at ninety-degrees to the direction of travel. If an enemy ship is hit it will fire back auto-Cannons are fired by matically.

```
3 LET P=PEEK (16396) + 256 * PEEK
(16397)
4 LET
5 LET
        LET AC=1
LET EEF=4
LET SSF=4
FOR G=1 TO 32
PRINT "X";
        FOR
        FOR I=1 TO 32
PRINT "X";
NEXT I
PRINT "WIND=
55
        PRINT
                        "SHIP=
                                             COURSE=
                                                                     DAMA
        PRINT
PRINT
6 4"
69
                        TAB 25; "7 X 3"
"INPUT COURSE (0 TO 7)
       PRINT "9 TO ATTACK";
PRINT TAB 27; "5"
POKE P+115,21
POKE P+207,21
POKE P+287,21
POKE P+379,21
        PRINT
       POKE
POKE
DIM
DIM
DIM
DIM
LET
                 Q(8)
5(8)
L(8)
C(8)
00
                 L(8)
C(8)
A=166
```

```
D=135

T E=1

T S(E) =0

T O(E) =3

E)4 THEN LET C(E) =7

T O(E) =0

KE P+L(E), S(E)

T ==E+MEN GOTO 205

E)5 THEN GOTO 190

T ASPA!
                                                                   IF E=5
LET A=A+1
LET D=D+66
GOTO 130
LET A=A+19
LET D=D-17
                                                                                                                                          A=A+1
D=D+66
    180
185
190
                                                                                                                                                    H=H+19
D=D-171
) 130
U1=1
F=1
U=INT (
                                                                       LET LET F G G IF S F IF
195
                                                                                                                                 205
210
215
217
229
                                                                                                                                                         H=9 AND AC=1 THEN LET XX
                                                                                                                                                    M=9 AND AC=1 THEN
                                                                                                         TF
                            232
```

```
233 IF M=9 AND AC>1 THEN GOTO 2
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                      LET U=PEEK (P+K+(J*U1))
IF U=0 THEN GOTO 661
IF (U=1 THEN GOTO 67)
IF (U=1 LEN U=1 (F) (F) (S)
IF (U=61 OR ABS (S(F) -U) (S)
N=2 THEN LET U=1 (S)
IF (U=61 OR ABS (S(F) -U) (S)
N=2 THEN LET U=10
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            535
                                                                          IF Man AND C(F) =5 THEN GOTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            545
                                                                              IF M=6 AND C(F) =0 THEN COTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            AND
655
              250
237 IF (M=1 OR
THEN GOTO 250
238 IF (C(F)=0
=7 THEN GOTO 25
245 IF ABS (M-1
                                                                                                                                                                                        OR M=0) AND C(F) =7
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               900
9ND
657
                                                                                                                                                                                                                            OR C(F) =1) AND M
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 GOTO 700
TF U=5 THEN GOTO 687
TF U=10 THEN GOTO 900
POKE P=5K+(J=U1),27
POKE U=1(J=U1),0
LET U1=U1+1
GOTO 635
LET U1=1
LET U1=1
LET U1=1
                                                                                                                                                                              (M-C(F)) >2 THEN GOTO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               550
                                                                       LET R=3

LET AC=1

IF ABS (M-U)=

IF ABS (M-U)=

IF Q(F)>6 THE

IF Q(F)>7 AND
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               553
565
679
579
587
5887
                                                                                                                 | AC=1
ABS (M-W) =3 THEN LET R=4
ABS (M-W) =5 THEN LET R=5
ABS (M-W) =4 THEN LET R=5
Q(F)>6 THEN LET R=2
Q(F)>7 AND Q(F)<10 THEN
              260 IF WILL OF RND WILL OF RESERVED AND WILL OF RES
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            585 LET V=011

13-AB

586 LET V=AB

587 LET V=AB

587 LET V=AB

587 LET V=AB

588 LET 
                                                                                                                                                                       THEN LET MU=MU- (34-M
       286
ET M
                                                                                                                                                                   OR M=5 OR M=6 THEN L
                                          36 IF M=4 OR M=5 OR M=6 TH

MV=MV+(38-M)

38 IF M=3 THEN LET MV=MV+1

90 IF M=7 THEN LET MV=MV-1

35 LET SX=1

100 LET X=PEEK (P+L (F)+(MV*

15 IF X=21 OR X=61 THEN GO
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            STY 114T INDIG $0.15 THEN LET G(Y) 230 IF US OR USE THEN LET G(Y) 250 IF US OR USE THEN LET G(Y) 250 IT US OR USE THEN LET G(Y) 250 IT US OR USE THEN LET G(Y) 250 IT US OR USE THEN LET G(Y) 250 IF USE OR USE THEN LET G(Y) 250 IF ROSE THEN LET GOTO 740 IT USE OR USE THEN LET GOTO 750 IF ROSE THEN LET GOTO 750 IT USE THEN LET GOTO 750 IT USE THEN LET GOTO 750 IT USE GOTO 750 IT USE
                                                                                                          X=PEEK (P+L(F)+(MU+SX))
X=21 OR X=61 THEN GOTO
          315
                     320
                                                                   IF X>165 THEN GOTO 350
IF SX=R THEN GOTO 385
POKE P+L(F)+(MV+SX),S(F)
POKE P+L(F)+(MV+SX),Ø
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 735 IF A
740 POKE
742 IF
                                                                   LET
                                                                                                                            5X=5X+1
                                                     0 GOTO 0000

LETT (F) = (F) + (MU*SX)

1 GOSUB 2000

1 GOTO 217

1 GOTO 217

1 GOTO 217

1 GOTO 217

1 F X 1 S 6 ND X (170 THEN LET

+ (X 165) T HEN LET T = T + (X - 16
                                                                                                                                   300
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 742 IF U)165 HAND

55F=55F-10 THEN GOTO 1000

743 IF 55F=0 THEN GOTO 1000

744 IF U)187 AND U<192 THEN LET
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 743 1F U)187 RND 0747 1F U)187 RND 0745 IF EEF=0 THEN GOTO 1050 745 POKE P+L (Y),21 750 LET 5(Y)=0 755 GOTO 900
                 340
347
350
352
T=T
355 IF XX187 THEN LET TST+(X-16)
356 LET L(F) = (F) + 
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   GOTO 900
LET AC=2
GOTO 602
LET K=L(Y)
IF N=1 THEN GOTO 769
LET N=1
GOTO 775
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        761
762
765
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             GOTO 7755

GET N=2

IF N=1 THEN LET U=5

IF N=2 THEN LET U=5

GOTO 6870

GOTO 6870

LET U=7

COTO 77

COTO 77
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            766
767
769
775
780
782
783
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               785
790
795
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            RETURN OLD 1920 DESCRIPTION OF THE PRINT OLD 1920 DESCRIPTION OLD 1920 DESCRIPTION OLD 1925 DESCRIPTION OLD 1925 DESCRIPTION OLD 1925 DESCRIPTION OLD 1925 DESCRIPTION OLD 1926 D
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          030
                        J=32
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               1032
              510
                                                                       IF C(F) =2 OR C(F) =6 THEN LE
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   RUN 5
                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               isas film s

1885 Philm 1886
1886 Philm 1886
                        J=34
15 IF C(F)=3 OR C(F)=7 THEN LE
J=33
              620
                                                                       IF C(F) =1 OR C(F) =5 THEN LE
          J=1
621
623
              521 LET AB=
523 LET U=0
525 LET N=1
530 LET V=1
                                                                                                                        AB=J
              632 | FT U1 = 1
```







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You are a pilot on a life or death mission Can you bomb a clear pathway through the city of skyscrapers wide enough for you

The silhouette of a skyscraper city is drawn on the screen; and at the top is a plane, which traverses from left to right, its altitude reducing on each traverse. If it hits a skyscraper the game ends.

Bombs may be dropped by pressing the space har

If a bomb hits a building it reduces it in height by one story.

The plane may be raised one line on the screen five times only, by pressing the 'UP

A variable difficulty level is provided in the speed of the plane, which may be 1-5. At speed 1 (fast) each hit scores five points, and at speed 5 (slow) each hit scores one point, etc.

A high-score feature is available, and retains the current highest score whilst the machine is switched on and the game loaded, provided it is not re-RUN

ARIABLES J.K: Loop counters PLS: Plane graphic NP\$: Blank, same size as plane

PO: Current 'PRINT(a' position of plane BD: 0 if no bomb in flight, else = 1

SP. The start position (PRINT@) of a bomb RA: The current no of raises left A: The points value of each bomb hit GS: A delay factor affecting plane speed A new ractor affecting plane speed The counter which uses the delay

The current high-score SC: The player's current score

Notes on Peeks and Pokes

To help convert to other machines, it is

necessary to explain the PEEKS and POKES. First, be aware that the Dragon screen is 32 characters wide and 16 high. Print positions start at 0 (top left) and end at 511 (bottom right).

Video memory starts at decimal RAM address of 1024. Thus RAM address 1025 = PRINT@ position 1. All PEEKS and POKES n the listing are directed at the screen.

BY KEITH CAMPBELL

# **RUNS ON A DRAGON 32 IN 32K**

CLS:PRINT035, \*SKYSCRAPER !\*:FO RI=OTO1000:NEXT CLS:PRINT YOU ARE THE PILOT OF

A BOMBER. YOUR PLANE IS CRIPPL ED AND YOU CAN ONLY CIRCLE THE WHICH YOU FIND YOURS

3 PRINT YOU ARE RUNNING OUT OF F 3 PRINT YOU ARE RUNNING OUT OF F UEL, ANDTHE ONLY WAY YOU CAN LAN D IS TO FLATTEN THE CITY BY BOMB ING IT, YOU CAN RAISE YOUR PLANE 5 TIMESONLY BY PRESSING THE UP

ANRUM 4 PRINT YOU CAN DROP A BOMB BY P 4 PRINT YOU CAN DROP A BOMB BY P RESSING THE SPACE BAR, ":PRINT:PR INT PRESS ENTER TO COMMENCE":IN

CLS:PRINT'ENTER YOUR PLANE SPE ED. ": PRINT: PRINT 1 IS FAST : PRIN T'S IS SLOW :: INPUTS 6 S=INT(ABS(VAL(S\$))):IFS<10RS>5

THENSELSEGS=S:A=6-5 10 FORI=1024T01535:POKEI:128:NEX 20 FORI=1504T01535:J=I 30 FORK=0TORND(12):POKEJ-K\*32,14 3:NEXT:NEXT 40 PL\$=CHR\$(142)+CHR\$(139)+CHR\$(

130) 50 NP\$=STRING\$(3,CHR\$(128)):PO=3 PRINTED, \*SCORE: \*;:PRINTE17, \*H

-SCORE: HS 60 PRINT@PO.PLS;:PRINT@PO-1.CHRS

45 CT=0:IFP0>473THEN2000 70 Zs=INKEYS:IFBD=1ANDZS=\* \*THEN 100ELSEIFZS=\*C \*ANDRA>0THENIFPD>6 4THENPRINTEPO,NP\$;:PO=PO-32:RA=R 75 CT=CT+1:IFCT < GS THEN70ELSEP

80 IFPEEK(PO+1026)=143THENCLS:PR INT0150, \*SPLAT! \*: PRINT: PRINT: YOU CRASHED INTO A SKYSCRAPER! \*: IPRI NT YOUR SCORE WAS: - 15C:GOSUB250 0:PRINT\*DO YOU WANT ANOTHER GO\*; IINPUTUS:IFLEFTS(US,1)="Y"THENSE 90 IFBD=1THENGOSUB1000:GOTO60ELS

100 IFBD=1THEN110ELSEBD=1:SP=PO:

EPRINTESP+32,80%; PRINTESP,CHR&C

2000 CLS:PRINT FANTASTIC! : PRINT "YOU HAVE RAZED THE CITY TO THE GROUND!":PRINT:PRINT YOUR SCOR MAS: ISC: GOSUB2500

2010 INPUT ANOTHER GAME : AS: IFLE FT\$(A\$,1)="Y"THENSELSEEND 2500 IF HS < SC THENLETHS=SC



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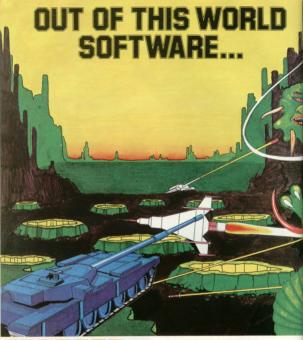


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a subtle new twist to an old gate the maze of rocks and You are the pilot of a space traversed a Stasteroid field craft on route to a refuelling and reached the refuelling station. Blocking your way is zone another is set up by the a field of stationary aster- computer.

There are some flashing sequences in the program that some people may find disturbing. To remove these sequences simply omit the following lines or statements. Line 2520: omit LET 1-USR scr. Line 3020: omit both LET 1-USR scr. Delete lines 3550 to 3570, 4020, 4320, 4110 to 4140, 4220 to 4250.

BY M. J. LEVER

# 100 REM Control Routing SUB 140 1000 DEMMARKS TO SECTION

12420 FOR # TO 289 1. LET CASCREENS (d ## 2000 FOR # TO 280 1. LET CASCREENS (d ## 2000 FOR ## 2000 FO

2000 BEN RESCHES ENG OF SCIERT

2010 PRINT AT 0d,a-1;"": FOR X= 1 TO 5: BEEP .05,0: BEEP .05 1: NEXT X: IF 0d')P THEN GO TO 2100 2020 FOR X=1 TO 28+INT (RND\*(lev +1)) +1))
2030 PRINT HT P,29; INK 2;"
INK 6;"4": BEEP .02,x+5: LE
L=fuel+1
2040 PRINT HT P,29; bs(1,4 T
1NK 2;"4": BEEP .02,30-x: P
AT 0,19-LEN STR\$ fuel; fuel; T AT p,29; INK 2; "地 : BEEP .02,x+5: LET 2100 LET sect=sect+1: IF sect=11 THEN GO SUB 3500 2110 GO SUB 7200: GO SUB 6020: G 0 TO 150

2500 RED RED OF FUE

2510 PRINT AT 0,16; PAPER 8: FOR X=0d+1 attr,64+INT (RND+8) + R SCT: PRINT AT X-1,8 ,a+1; BEEP .01,5 21,51-X: NEXT X: POKE 1; "000" 2520 INK 8: PAPER TO 21: POKE attr. 8: LET L=USR scr. 8: LET AT X a+1; ") No Edit Punks attr fasthir (Rhote) :

"ATT X = 1 | 1 | 1 | 1 | 1 | 1 | 1 |

"ATT X = 1 | 1 | 1 | 1 | 1 |

"ATT X = 1 | 1 | 1 | 1 |

"ATT X = 1 | 1 | 1 |

"ATT X = 1 | 1 | 1 |

"ATT X = 1 | 1 | 1 |

"ATT X = 1 | 1 | 1 |

"ATT X = 1 | 1 | 1 |

"ATT X = 1 3000 3000 3010 FOR X=1 TO 20: PRINT AT d,a 3010 FOR X=1 TO 20: PRINT AT d,a 1; INK 6;"3": BEEP .01,25: PRI NT AT d,a+1; INK 1;"3": BEEP .0 1,26: NEXT X 1480 MAN 1 - 20 TO 10 STEP 1 TOOK E STEP 1 T

3500 LEI 10EC 10E. 00 1 OSA DEINT HT 0.0/PEPPRE ENTERI OSA DELTOR OF PEPPRE POR JUL HE TO LIGHT SPECTOR OF STEP 5. BEEP 1550 FF 5kt. 3 THEN LET Shash... 1540 GO SUB 70.07 POKE SILT. AS 1540 GO SUB 70.07 POKE SILT. AS 1540 POKE SILT. BEET (1508 S.Y.) 1644 S.Y. 1540 POKE SILT. BEET (1508 S.Y.) 1644 S.Y. 1540 POKE SILT. BEET (1508 S.Y.) 1644 S.Y.



# 

**RUNS ON A SPECTRUM IN 48K** 

TX0 FOR X=1 TO 10. POKE attr.92 SLET (=USR scr: PAUSE 2: POKE a ttr.75: LET (=USR scr: BEEP, 02) TO NOTE PAUSE 8; INK 8; AT 9,00 POKE attr.71: LET (=USR 3500 LET fuel=fuel+50: LET sect: 1: RETURN

4000 4010 PRINT AT 7,0," X =0 TO 255 STEP 3: OUT 4020 FOR

4020 FOR x=0 TO 255 STEP 3: OUT 254,x: PORE attr,x: SEEP ,005,x/ 4030 FOR 157 STEP 1: USA SCE 4040 FOR x=1 TO 100. NEXT X 4050 FOR x=1 TO 24: LET L=USA SC 52: PAUSE 1: NEXT X

AGE OF THE PROPERTY OF THE PRO

4200 CLS 4210 PRINT INK 5;" H A L L OF F R M E" INK 5;"

INK 6;" LEVEL 4220 PRINT '

4230 PRINT 4240 FOR X=1 TO 9: PRINT TAB 3;X

T88 10:55(x);T88 27;5(x): NEXT

AREN PRINT INK 5;" 4250 PRINT ' INK 5;" PRESS ENT ER FOR ANOTHER RAME' 4270 LET 1, PREEK 23672/5: GO TO 4 N BEEP 1, PREEK 23672/5: GO TO 4 4275 IF is () CHR\$ 13 THEN GO TO 4

Solo FOR x=10 TO 30 SEEP 11/3:
NEXT 1 00 SUB THEN SO TO 430
NEXT 1 TO SUB THEN SO TO 500 TO 500
NEXT 1 TO SUB THE SUB T

4320 POKE 65003,0: POKE 65006,24 4320 POKE 65003,0: POKE 65006,24 FOR x=0 TO 7: FOR y=0 TO 7: PO KE attr,x+50,9: LET LeibR Scr; BO RDER y: BEEP, 05,9+x: NEXT y: NE RDER y: BEEP, 05,9+x: NEXT y: NE

73% BORDER 0: POKE attr/71: LET 1330 BORDER 0: POKE attr/71: LET 1=USR scr: PAUSE 50: FOR X=1 TO 11: LET 1=USR 3582: PAUSE 1: NE

XT X 1NK 8: CL5 4440 FOR X=29 TO 32: CIRCLE 130, 1450 FOR X=29 TO 32: CIRCLE 125, 104,00 1450 FOR TO 145 TO

3 4380 FOR x=1 TO 7: POKE attr.x: LET t=USR scr: PRUSE 4: NEXT x: GO TO 4380 . "UDULD YOU LIKE THE 4880 PRINT

4800 PRINT "WOULD YOU SAME SECTOR?" INKEYS: IF 4310 LET 15 INKEYS: IF THEN GO TO 4810 A

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FOR X=0 TO 10: BEEP .06,X BEEP .2.0 FOR x=1 TO 100: NEXT x

6000MATERIAL TRANSPORTED TO THE PERSON OF TH

6010 POKE 23693,71: BORDER 6020 PRINT AT 0,0 "SCORE 2000 FU EL:000 SUBSECTOR:00"; AT 0,10-LEN STR\$ sc:sc;AT 0,19-LEN STR\$ fue L;UeL;AT 0,32-LEN STR\$ scct.sec t: OUER 1: PRINT INK 8:PT

9,11;" ";87 %; 0,11;" ";87 %; ": OUER 0 T AT 1,0; INK 7;: ! PRINT as (Sect,x) 6030 PRINT NEXT 40 LET p=INT (RND\*19)+2: PRINT Tp-1,29;"",RTp,29; INK IN (RND\*3)+3;"",RTp+1,29; (RD\*3)+3;",4 T0 p+1,29; 00 INPUT "...PRINT #0;" SHIPS: 1; FOR x=1 T0 Live; PRINT #0;

RINT #0;" SHIPS Lives: PRINT #0 +4;" NEXT 6100

7000 TO THE PARTY OF THE PARTY e=150 SCAO LET tives=3: LET to DIM as tip, 21, 22) . LET na=5: DIM as tip, 21, 22) . LET na=5: DIM as tip, 21, 21 To DIM as tip, 21 To D aş(10,21,32): LET na=sk

7090 FOR Z=10 TO 12: LET a\$(x,z, TO 5)=" ": NEXT Z 7100 NEXT X 7200 LET d=11: LET a=0: LET od=d : LET oa=a 7210 LET c=0 RETURN

ROOM SERVICE OF THE S

8010 POKE 23693,58: BORDER 7: CL

LEVEL KE attr,56+INT (RND+5)
R scr: LET is=INKEY\*:
OR is> 9" THEN BEEP ,
GO TO 8040 (1 - EASIEST, 9 (RND+5): L .01,R SK = UAL 15/10 23693,23: BORDER 0: CL

00: F EHSE

8230 LET LEV=URL 15

900003-00003-00003-000 9010 POKE 23593,71: BORDER 0: CL POKE 23658,0: RANDOMIZE : R x =USR "a" TO USR "9"+7

READ a: POKE X,a NEXT 9050 FOR 9050 FOR 9070 REA 9080 NEXT OR x=1 TO 18 READ a: POKE x+64999.a

555 9100 LET scr=65000: LET attr=scr

9110 FOR X=7 TO 0 STEP -1

POKE attr, x +8+x +64 LET t=USR scr: BORDER x: B 9120 9130 EP .3, -x -20 140 NEXT X

R x=1 TO 50: PLOT RND #255 x=38 THEN PRINT AT 21,0; a 0: IF 32) x=39 THEN PRINT AT 21,0; 150

9160 IF X=30 HERN FAIN H 21.0
1100 IF X=40 THEN PRINT AT 21.0

STASTEROIDS E 23692,-1: FRINT PRINT PAPER 2; "S 1983 M.J. LEUERS @ PRINT "The idea is to pilot a S rough a sector of 9280 9298 Through Pitot a space with a state of the st ith 150 units Deel. You "start with 150 units perint "start with 150 units upel. Ifit runs out or you't three ships the game ends." I score is the distance you are to travel."

PRINT " If you reach the end sector enother is ge rash manage to

ated." B PRINT "KEYS: 1 - UP, Z -9320 PRINT 10; PAPER 1; "PLERSE PRESS ENTER TO CONTINUE " 9330 DIM 5\$(9,12): DIM 5(9): FOR x=1 TO 9: LET \$\$(x) = "ZX Spectru 8": NEXT X 9340 POKE 65003,32: POKE 65006,2 19350 DIM b\$(2,7): LET b\$(1) = CHR( 9350 DIM b\$(2,7): LET b\$(1) = CHR( 16+CHR\$ 3+"<"+CHR\$ 15+CHR\$ 6+"%" b": LET b\$(2) = CHR\$.15+CHR\$ 4+"<"

INKEY\$ <> CHR\$ 13 THEN GO 9360 IF TO 9360

9400 RETURN

9500 BENEDICE FOR U. D. C. 9510 DATE 135,223,50,254,50,223, DATA 192,112,204,255,204,11 2,192,0 9530 DATA 68,16,130,40,128,18,12 9540 DRTA 29,21,119,215,119,21,2 DATA 35,90,129,130,65,129,1 9560 DATA 0,6,24,98,24,6,0,8

9500 REM Date For Machine Code 9610 DATA 62,0,17,0,88,6,24,197,6,32,18,19,16,252,193,16,245,201 following user

9900 REH The D = 0 C = 8 = 36

= < G = 4 E = 0 . F 9998 REM H

9999 REM

```
REM DRAGON RUN....BY PETER AND MARK WRIGHT.....JUNE
5 DIM N$ (50) . S$ (50) . A$ (1) . Z$ (1) : POKE 752. 1
7 GRAPHICS 0: SETCOLOR 2.14.4: SETCOLOR 4.1.2: N#="SIR "
10 ? "THE SPORT OF DRAGON RUNNING.":? :? "ragon running was an ancient sport"
12 ? " in medievel England.":? :? "The Dragon Runner was taken through"
14 ? "the dragon's forest unarmed. By using":? "skill and cunning alone he had t
16 ? "return to the castle.":? :? "If he succeeded, the Castle Baron":? "would r
eward him with a purse of 100"
18 ? "gold pieces, if he failed.....":? :? "The sport died out as one by one th
p "
20 7 "wandering runners were eaten.":? :? "See how many runs you can make ere "
22 ? "you become a dragon's dinner.":? :? "If you wish to play, please enter":?
"your name and press RETURN"
30 INPUT S$: N$ (LEN (N$)+1)=S$
```

3A GRAPHICS O: SETCOLOR 2.14.4: SETCOLOR 4.1.2 40 ? :? N\$:? :? "YOU ARE NOW A FULLY FLEDGED DRAGON":? "RUNNER IN PERSONA (D.R.I

45 ? : ? "YOU ARE CHARGED THAT USING ONLY THE"

50 ? "ATARI JOYSTICK (in the left hand":? "socket) YOU WILL AVOID THE GREEN" 55 ? "DRAGON. ":? :? "IF YOU REACH THE CASTLE GATE SAFELY":? "YOUR FORTUNE WILL B AO 2 "100 GOLD PIECES AND YOU WILL OFFERED": 2 "A FURTHER RUN, ": 2 : 7 "WHEN YOU HA

VE 1000 BOLD PIECES LIFE" 65 ? "WILL BECOME MORE DIFFICULT!!!!":? :? "PRESS RETURN WHEN YOU ARE READY FOR

70 ? "YOUR CHALLENGE.GOOD LUCK!!!!!": INPUT A\$ 90 GP=0

100 BRAPHICS 5: SETCOLOR 0,12,6: SETCOLOR 1,3,4: SETCOLOR 2,0,8: SETCOLOR 4,12,2: POK 105 COLOR 3

110 I=15:PLOT I,0:PLOT I+2,0:PLOT I+6,0:PLOT I+8,0:PLOT I,1:DRAWTD I+2,1:PLOT I+ 6.1:DRAWTO I+8.1:PLOT I+4.1

120 PLOT I, 2: DRAWTO I+8, 2: FOR N=3 TO 4: PLOT I, N: DRAWTO I+2, N: PLOT I+6, N: DRAWTO I +8. N: NEXT N 130 FOR I=1 TO 25: X=INT(76\*RND(1)+2):Y=INT(35\*RND(1)+3):COLOR 1

140 PLOT X,Y:DRAWTO X+2,Y:PLOT X+1,Y-1:COLOR 2:PLOT X+1,Y+1:NEXT 1 145 COLOR 0:1=18:FOR N=3 TO 5:PLOT I,N:DRAWTO 1+2,N:NEXT N

149 ? "THE DRAGON HAS SEEN YOU": ? "RUN FOR YOUR LIFE!" 150 BOSUB 1500

155 ? "YOUR FORTUNE IS "; GP; " GOLD PIECES": ? :? 160 M=X:E=39:D=Y:R=INT(7\*RND(1)+30):D1=X:R1=3

170 COLOR 3: PLOT M.E: SOUND 0,0,0,0: IF (M=19) AND (E=4) THEN 1000

180 Z=STICK(0): IF Z=15 THEN 180 181 SOUND 0,0,5,15

182 IF Z=7 THEN 190 183 IF Z=11 THEN 220 184 IF Z=13 THEN 250

185 IF Z=14 THEN 280 186 IF Z=10 THEN 280 187 IF 7=6 THEN 280

188 IF Z=9 THEN 250 189 IF Z=5 THEN 250

190 LOCATE M+1,E, XX: IF XX<>0 THEN 300 200 COLOR O:PLOT M, E:M=M+1:IF M>78 THEN M=78 205 BOSUB 500

220 LOCATE M-1,E,XX:IF XX<>0 THEN 300 230 COLOR O:PLOT M, E: M=M-1: IF M<1 THEN M=1

235 GOSUB 500 240 GOTO 170 250 LOCATE M, E+1, XX: IF XX<>0 THEN 300

260 COLOR 0:PLOT M, E: E=E+1: IF E>39 THEN E=39 265 GOSUB 500

267 IF Z=9 THEN 220 268 IF Z=5 THEN 190

270 GDTD 170 280 LOCATE M,E-1, XX: IF XX<>0 THEN 300 290 COLOR 0:PLOT M, E: E=E-1: IF E<1 THEN E=1

293 GOSUB 500 294 IF Z=10 THEN 220

296 IF Z=6 THEN 190 298 GOTO 170

# VARIABLES

N\$ and S\$: These strings are concatenated to form

players name and give him a title. Z\$: Replay response (Y or N). G.P.: Gold pieces. M.E. Players position

D.R: Dragon's position D1,R1: Second dragons position. A.B. Dragon movement amendment to D.R. F.C. Second dragon movement amendment to D1,R1.

Line 181: The odd number in the distortion position (SOUND 0.0.5.15) gives a click when the sound is turned on, and a click when turned off. This is used for

Line 500: Makes A and B either 1 or -1. These values are used later to modify the dragon's position. Line 520: Looks to see if there is a tree in the way. If

there isn't D and R are modified in line 530. If there is the Line 1250: POP is the command to clear the return

address as the program has jumped from a subroutine to The authors say that it should not be too difficult to this line.

adapt the program to a one or two player format. One audpt the program to a one or two prayer rounds one using a joystick to control the dragon — the other controlling the man.

my dears. He'll singe your eye-He's a ravenous beast and will at you if you let him get near

Once there was a great and brave dragon hunter in these parts who tracked down dragons for gold. Even he couldn't defeat

> 2:SOUND 0, H, 10, N 2055 NEXT N: NEXT I: SOUND 1,0,0,0 2060 DATA 162,0,162,2,162,4,193,2

2100 RETURN

given up and keeps on trying to beat the dragon. But the monster keeps chasing him back to the

castle The object of this game is to get from the hottom of the screen to the castle at the top using the invstick controller. You are chased by a computer controlled

gold coins by way of reward.

The secret of the game lies in the glades and copses of the to the castle. Neither you or the dragon can pass through the forest - but if you are tricky enough you can trap the dragon within the trees and race to the castle before it escapes.

If you manage to complete 10

You are represented on screen by a white square, the dragon by a green square. The dragon does not appear until you start moving. To slam the castle door you must be positioned exactly in the centre of the castle gateway. And remember you are



2050 FOR I=1 TO 4:READ H,K:SETCOLOR 4,15,K:SOUND 0,H,10,15:FOR N=15 TO 0 STEP

# At last. A range of software that's as well designed as the Dragon 32.

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# DRAGON 32 The first family computer.



ELECTION

```
DIMA(22),S$(22),Q(22),M1(22)
 FORI=1T022:READA:A(I)=A+32768:NEXT
 DATR41, 46, 51, 56, 61, 66, 71, 76, 276, 476, 676, 876, 871, 866, 861, 856, 851, 846, 841, 641
 DATA41.241.X.MAGGIF.CVRIL.TONY.ROTHEY.LAB.CON.LIB.SDP.IND
 M$(A)="Western the books": GOSUB65
6 PRINT" WOMEN YOU WANT INSTRUCTIONS ":
 GETA$: IFA$=""THEN?
8 TERK="V"THENPRINT" #VES": GOSUR152: GOSUR137: GOTO10
9 PRINT" #NO" : GOSUB152
18 POKE59468, 12: FOR I=1TO5: READN#(I): NEXT
11 PRINT"7": GOSUB65: INPUT"XNHOW MANY NOMINATIONS (1-5) "; N
  IEN>50RNC1THEN11
13 FORT=1TON:PRINT"MCANDIDATE": I::INPUT"YOUR NAME ":N$(I):NEXT
14 FORI=1T05:N(I)=ASC(LEFT$(N$(I),1))+64:NEXT:GOSUB51
15 FORT=1T05:M$(I)=M$(I-1)+"M":M(I)=1500:V(I)=0:READP$(I):NEXT:M$(0)=""
16 M$="#BBBBBBB": M1$=M$+M$+"N": M2$=M1$+M$: M$=M$+"N"
17 GOSUB149:C$=M$(5)+"XDXXX"
                        ": Ts(1)="s
18 D$(0)="
           AMBRIET.
                 NUMBER
                                   NEBEL & NEBEL
                  MERCHA M": DS(3)="5 ANDERS A MERCHA
19 D$(2)="$| •)
20 D$(4)=" No ONEED!
                  MERNIO OF : D$(5)=" No oxeni o xumble of"
   D$(6)="ple example example of"
  FORI=0T06:D$(I)=C$+D$(I):NEXT
23 FORT=1T022:READS$(1).0(1).M1(I):NEXT
24 DATADOUBLE PAY,88,0
25 DATAGAIN 1000 VOTES, 1000, 0
26 DATABAD PUBLICITY. LOSE 500 VOTES, -500,0
  DATABLECTION, 5.0
28 DATA PRESENT A PLAN TO CREATE JOBS DODD DDD DDD DDD FOR UNEMPLOYED. GAIN 5000 VOTES
   DATA5000.0
  30
  DATABUY NEW SUIT...COST $320,0,-320
DATAEMPLOY P.R FIRM,66,0
34 DATAELECTION, 5, 0
  DATAPRESENT BUDGET.LOSE 2000 VOTES, -2000,0
   DATAHOUSE OF COMMONS, 99, 0
36
   DATAUNION PAYS YOU $1000,0,1000
   40 DATAFLECTION, 5.0
   DATA"SHOUTED DOWN IN HOUSE DECEMBED DECEMBED DECEMBER 1000 VOTES", -1000,0
  42
43 DATALOSE 500 VOTES, -500, 0
44 DATASALARY INCREASE 20%, 77, 0
45
   DATABLECTION, 5.0
   46
47
   FORI=1T05:S(I)=2000:READD(I):P(I)=1:POKEA(1)+D(I),N(I):NEXT
48 DATA0, 2, 41, 80, 82
49 GOTO68
50 FORI=0T04:FORK=0T029:POKE33373+I*40+K,32:NEXTK,I:RETURN
51 PRINT"3"; :FORQ=1T05:PRINT" # --
52 A$="###### : FORT=1T024: PRINTA$; : NEXT
53 FORI=1T03:PRINTB$;:NEXT
54 FORI=1T08:PRINT" # " ;
55 IFQ=5ANDI=7THENPRINT"# " I=8
56 NEXT
57 NEXT: POKE33767, 254
58 AS="IDDDDDDDDDDDDD
59 PRINT" MANAGAMENTE";
60 FORI=1T015:PRINTA$; :NEXT
  PRINT" SIGNIFICATION NAME
                          PARTY MONEY
                                        VOTES ****;
  PRINT" PREPARE "
63 PRINT" SINGRIPARING BURNES BERT
64 RETURN
65 PRINT"73
66 PRINT"
                    ELECTION CAMPAIGN
                                             ":RETURN
67 PRINT"S
68 FORP=1T05
69 GOSUB132: IFP>NTHENGOTO90
                                                       COMPUTER & VIDEO GAMES 49
```



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UM COMPUTER GROUP MEMBER



111 GOSUB51:GOSUB149

113 GOT0132 114 GOSUB152 115 IFP>NTHEN135

112 FORI=1T05:POKEA(P(I))+D(I),N(I):NEXT



- IFPA>M(P)THEN123
- 119 V2=0:V=INT(PA/10):FORV1=1TOV:V2=V2+INT(RND(1)\*100+1):NEXT
- 120 GOSUBSO
- 121 PRINTC\$; "YOU GAIN"; V2; "VOTES": V(P)=V(P)+V2:M(P)=M(P)-PA
- G0T0152 GOSLIBSO: PRINTC\$ "YOU CAN ONLY AFFORD": M(P)
- 124 PRINTC\$; "MIF YOU DO NOT WANT A P.R FIRMDDDDDDDDDDDDDDDTHEN ANSWER O'
- 125 GOTO114 126 FORK=1T030:D=INT(RND(1)\*6+1):PRINTD\*(0):PRINTD\*(D):NEXT:RETURN
- IFZ(P(P)THENM(P)=M(P)+S(P):G0T0130
- FORM=P(P)TOZ:POKEA(M)+D(P),N(P):G=M-1:IFM=1THENG=22
- 129 POKEA(G)+D(P),32:G0SUB153:NEXT:P(P)=Z:RETURN
- 130 FORM=P(P)T022:POKEA(M)+D(P),N(P):POKEA(M-1)+D(P),32 131 G0SUB153: NEXT: P(P)=1: G0T0128
- 132 FORT=0T029:X=PFFK(33053+P\*40+T)
- 133 X=X+128+(X>127)\*256
- 134 POKE33053+P\*40+I,X:NEXT:RETURN
- 135 PA=INT(RND(1)\*M(P)):PRINTC\$;"W I WILL PAY \$";PA
- 136 FORT=1T0599:NEXT:G0T0119
- 137 POKE59468,14 138 PRINT"O"
- 139 PRINT"MIHIS IS THE GAME OF "TOTAL". THE"
  140 PRINT"08JECT OF THE GAME IS TO COLLECT VIOLES FROM YOUR CONSTITUENCY.
  141 PRINT"MIO WIN , YOU MUST ENTER THE HOUSE OF COMMONS WITH MORE THAN COMMONS WITH MORE THAN";
- 142 PRINT" 25000 VOTES.
- 143 PRINT"MAF YOU LAND ON AN "TL" INTY SQUARE THEN
- 144 PRINT" TAN ELECTION WILL BE HELD.
- 145 PRINT"MUP TO 5 PEOPLE CAN PLAY , WITH ME ACTINGAS ANY EXTRAS REQUIRED. 146 PRINT"XMM";TAB(7);"ば口ー♥♥ セノフェートローアイベノフ書"
- 147 GETA\$: IFA\$=""THEN147
- 148 PRINT"" RETURN
- 149 FORI=1T05:PRINTM\$(I);"
- 150 PRINTM\$(I);N\$(I);M\$(I);M\$;P\$(I);M\$(I);M1\$;M(I)
- 151 PRINTM\$(I);M1\$;"\$";M\$(I);M2\$;V(I):NEXT:RETURN
- 152 FORI=1T01E3: NEXT: RETURN 153 FORI=1T0500: NEXT: RETURN
- 154 GOSUB152: GOSUB50
  - 155 PRINTC\$" BANKRUPT...BACK TO BEGINNING":M(P)=0:V(P)=0:POKEA(P(P))+D(P),32 P(P)=1:P0KEA(1)+D(P),N(P):G0T0152

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# PROGRAM NOTES

```
18 X=87F;Q=88F
 28 S##8080; B##8080; H=0; Z##80
58 C78=32; C71=X; C72=Q; C73=#FF
68 DO P. $12
 79 DO IN. "SKILL LEVEL (1-5)"W.U. WY PND W(6
 98 N+0: T=0: 8=0: A=3
 98 CLEARS MOVE 8,43 DRAW 63,43
100 7#E1=0
110 F.J=64 TO 511
120 R#R.R.74
138 N=N+(R=1 OR R=2)
ARG N I
160 Pa272:S?P=171
               Press"$128"any"$128"key"$128"to"$128"start"
100 P-2727
188 LI. #FFE3
190 Y=10:F.J=100 TO 1 S.-1:7Z=J;LI.SS0:N.J
200 P.#30;LI.#FE22;?#E0*21;P."HIGH: ".H
228 DO Des
238 78×2: IF B?1×254: D×32
248 7843; IF 871=254; D=-32
250 7B=1:0=0-(B?1=251)
258 78=9;D=D+(B?1=247)
278 TF D=8:D=F
298 Feb
298 L=P;P+P+D
380 IF PX32*8 AND LX32*31;P*P-32
 310 IF PX32=31 RND LX32=0;P=P+32
 330 IF P)511/P=P-448
 348 WATTIVESTP
 350 IF V=0, GOS.
```

360 IF Vex:TeT+5+284:NeN-1:72=40:Y=40:L1,652

```
TO TE VESEE COS. V
378 IF VEEFFIGUE.K
                 "T," LIVES
398 P.$38*SCORE
488 F. J=1 TO 15-WX3: WRIT: N.
410 U.N=0 OR R=0
428 Y=10:F.J=1 TO 100:72=J:L1.SS0:N.J
438 78=8
448 IF TOH:H=1
458 L1. WFFE3:U.R
400 IT 8.R.25;T=T+18+4#1:N=N-1;?Z=38;Y=48;L1,558;R.
488 WAIT | STL = 32
498 72*8; Y*158; LI. SS8
500 F.Jel TO 4
SIR WRITISTPHY
528 F.K=1 TO 158; N.K
538 WAIT: S?P*171
548 F.K+1 TO 158 N.K
558 N.J
568 F.J=1 TO 1588; N.J.R.
                      hlockbuster"'
5781P.$12"
588 P. SAFF"....SINGLE SCORE"
590 P. $#9F".... DOUBLE SCORE, 28% RISK"
580 P. SHOF".... RVOID AT ALL COSTS!"
610 P. "CONTROLS:""
628 P. "CURSOR KEYS...UP & DOWN"
630 P." ( % ), .. LEFT % RIGHT"''
640 SSR=-1;SS1=-1;SS2=-1
 658 P. #21
 678 SS8 LDR B+2
698:SS1 LDX Z
498:SS2 DEX:NOP:NOP:BNE SS2:EDR 84: STA 8+2:DEY:BNE SS1:RTS
```

UNIC ON AN ATOM IN A

718 P. \$6) LI. #FFE3; R.

# BLOCKBUSTER

## BY CHRIS CYTERA

Trapped within a vast maze built with solid blocks of some strange alien substance on a weird and wonderful planet, you must navigate your way to freedom or else be doomed to wander the labyrinth forever!

That's the challenge of Blockbuster, an original little diversion with some interesting twists — and turns!

In this fast moving game you control an inverted cross — that just can't keep

still. So to keep up with the action you need a fast mind and dancing fingers!

You can smash the white

hlock with a well aimed sore, but avoid the grey blocks at all costs — contact with one of these will end one of your three lives. You can take a chance with the blocks branded with an inverted question mark — if you manage to smash one you'll get double points, but there's a calculated risk that it could wipe you out.

The bouncing cross can

be controlled by using the cursor control keys for updown movements and the inequality keys (<>) for right and left. Holding down a horizontal and vertical direction key at the same time enables you to move diagonally.

Your current score, lives remaining and the highscore are displayed at the top of the screen.

If your Atom has a colour card there is an additional bonus — the blocks come in different colours.

Chomp, munch, slurp ... burp! Oh, excuse me! I can't stop long because I've got a dinner date with these two tasty looking ghosts I met down at the Programmers Arms last night

They invited me up to their maze to see their dot collection. Why not, I thought . . .

This version of the arcade classic follows the regular theme. The happy eater munches his way around a maze - avoid-

ing the hungry ghosts. These ghosts are randomly guided and are not particularly energetic. tending to frequent one particular part of the maze. However, they are capable of a quick sprint

down the corridors when vou least expect it!

The best tactic is to munch your way around as close to the ghosts as possible at the start of each new maze, as the ghosts are as hungry for

ots as you are. You score one point for

each dot consumed, and once you've cleared one maze a new one is provided. The ghosts start each new maze at a random position and you continue where you left off.

There are two skill levels and if you manage to munch your way through seven mazes at level one you automatically move up to level two. Control keys are the 'W'. 'X'. 'A' and 'O' keys.



#### RUNS ON A BBC MODEL A IN 16K

#### BY MARK CLEWETT

10REMARSPACMANASS 20REMIXXBY MARK CLEWETTREE

30RFM1111/10/82111

40M00F7

SOPROCintro

60MODE 7

70PROCinit 90P90Cinit?

90PROCmaze

100PROCdots 110PROCobosts

120PROCpacmove 130FND

140REM#ONE DATA LINE = ONE TEXT LINE#

150REM#EACH NO. IS ONE VOU CHAR.#

1800ATADX, 181, 160, 188, 172, 180, 160, 188, 172, 172, 172, 180, 160, 188, 172, 172, 172, 180, 160, 232, 180, 160, 188, 172, 172, 172, 180, 160, 188, 172, 172, 172, 180, 160, 188, 172, 180, 160, 234

190DATADX, 181, 160, 181, 188, 165, 160, 173, 172, 252, 188, 165, 160, 173, 172, 172, 236, 181, 160, 234, 181, 160, 253, 188, 172, 172, 165, 160, 173, 252, 188, 172, 165, 160, 173, 180, 181, 160, 234 2000ATADX, 181, 160, 173, 165, 160, 160, 160, 160, 175, 165, 160, 160,

160,160,160,170,165,160,170,165,160,175,165,160,160,160,

2005, 210001802,181,180,150,160,160,160,160,160,160,160,160,160, 180, 160, 160, 160, 160, 180, 180, 160, 160, 160, 234 180,181,160,188,172,172,172,172,172,172,170,160,151,160, 173, 172, 172, 180, 160, 188, 173, 180, 160, 180, 160, 234

25094744,374,3804,380,400,373,3804,3804,1804,1804,230 250847882,181,180,185,180,173,172,185,180,173,172,172, 172,165,160,181,160,160,160,160,160,181,160,175,172, 272,172,172,165,160,173,172,165,160,165,160,234 

250081807, 181, 150, 150, 150, 158, 172, 180, 150, 188, 172, 172, 172, 172,172,172,180,160,188,172,180,160,160,160,234 26084T807,181,160,181,160,173,188,165,160,173,172,172,236,

160,181,160,173,172,172,172,172,172,172,165,160,181,160, 172,165,160,160,160,160,160,160,160,160,160,173,172, 165,160,160,160,160,160,165,160,160,160,160,234 ZB00ATAD1, 181, 180, 188, 180, 160, 160, 160, 160, 252, 180, 160, 160, 2007,

2900A7A0X,181,160,181,173,180,160,188,172,175,173,180,160, 188, 172, 172, 174, 181, 160, 234, 181, 160, 191, 173, 172, 172, 180, 160, 188, 175, 173, 172, 180, 160, 188, 165, 181, 160, 234 3000ATADX, 181, 160, 173, 172, 165, 160, 173, 172, 172, 172, 165, 160, 173, 172, 172, 172, 165, 160, 170, 165, 160, 173, 172, 172, 172, 172, 165, 160, 173, 172, 172, 172, 165, 160, 173, 172, 165, 160, 234 3300EFPROCInit 340DIMK(39):HSC=0:AZ=160:BZ=320:CZ=10 360ENDPROC 3700EFPROCinit2 380VDU 23:8202:0:0:0 390XX=20: YX=14: DX=144: SC=0: SSC=0: SHEET=1 400#FX11.8 410#FY17 0 420ENDPROC 430DEFPROCAOTS 440F0RS1=2 TO 37 450F0RT1=4 TO 18 4601FSX=13 AND TX=9 THEN 520 470IFSX=26 AND TX=13 THEN 520 4801FSX=13 AND TX=13 THEN 520 4901FSZ=26 AND TZ=9 THEN 520 500IFSX)16 AND SX(23 AND TX)9 AND TX(13 THEN 520 5101F?(HIMEM+SZ+TZ#40)=160 THEN PRINTTAB(SZ, TZ);CHR#(164) 530NEXT 540ENDPROC 82011=11:41=41 8301FA\$="W" YlsYL-1:8070980 550DEFPROCease 8401FA\$="X" Y%=Y%+1:60T0880 5551F SHEET>7 THEN SKILL=2 8501FA\$="A" XX=XX-1:PX=251:8019880 56002=02+1 8501FA4="D" X1=XI+1:P1=247:8010880 distribution of the state of th 5701F DX=152 THEN DX=145 SROPRINT SEOLF : HIMENTANTANTANTON UN PINICENTANTANTANTANTON IN BROIF? (HIMENTETTT NO OLSO THEN 900 ELSE BETD910 ement instantaurianen jakon itala 1900 taken deretak 900FF1(HIMEN\*IX\*TIA01=164 THEN SC#SE\*11500MD 0,-15,2,2 ELSE IX\*II: 590NZ=3 600FBRIZ=AX TO BZ STEP CZ 610RESTORE IX 120 TURNS STREET AND THE SHEET SKEET SKEET 1: ELS: 601096LSE 8010 760 620FORJX=0T03B:READK(JX):NEXT Y1=Y1:80T0920 630F0RJX=0T038:MX=K(JX) 640PRINTTAB(JI,NZ): CHR\$(MZ) 950FEINTAS(0,20);CHRS(141);CHRS(134);CHRS(135);\*5COSE ";SC 650NFYT 980FEINTIAE(0,21); THE\$ (141); DHE\$ (124); DHE\$ (135); \*SCORE \*; SC 660NX=NX+1 670NFYT PROFEINTIFE(10, 20); DRES(141); CASE(134); CASE(135); "HI-SCORE "; HSC 680ENDPROC 690BEFPROCScore 700PRINTTAB(0,20); CHR\$(141) "SCORE "; SC 1000PRINTIAB(XX, YX); CHR\$(PX); TAB(0, 25) 710PRINTTAB(0,21); CHR\$(141) "SCORE ";SC 720PRINTTAB(20,20):CHR\$(141)"HI-SCORE ":HSC 730PRINTTAB(20,21);CHR\$(141)"HI-SCORE ":HSC 104001-880(33)-2-VI-880(15)-3:1F U1)17800 U1(22 GR V1)9 800 V1(11 740ENGPROC 1020ENBPROC 750DEFPROCpaceove 10300EFPROCabosts. OR U1=13 AND V1=9 THEN BOTD1040 760PRINTTAB(X1, Y1); CHR\$(P1) 106002-R00 (351-72-V2-8ND (15)-5-1F U2)17600 U2(22 OR V2)9 600 V2(11 10501F?(HIMEM+U1+V1840)(>16458T01040 770PROCscore 780PRECghosteove 790IF SKILL=2 THEN PROEghostagve DR U2=13 AND V2=9 THEN B0T01060 10701F7(HIMEM+U2+V2\$40)(>164 THEN BOTO1060 1080PRINTERSULT, VI); CHPS (223); TAS(UZ, VZ); CHRS (192) 810#FX15,1 COMPUTER & VIDEO GAMES 59

# ROMIK SOFTWARE

24 Church Street Street Street Street St 1 1PT Telephone-Stough (STD 8753) 71535

#### STRATEGIC COMMAND by Alan J. Ovens

Affect Compact Compact.

For the Compact. offer in buttle. There is also an air reconnaisance facility. The game takes a few minutes to learn, but can take anything from a few minutes, to severa hours to play, depending on the skill of the players.

#### MULTISOUND SYNTHESISER

by Darren Hall

by Darren Hall

The susespindow VII-20 in machine code of coursely the synthesizer is split into bur mansections. I, normal, X, commit with himse, X, programmable background mace: 4, when robe.

Manage and background is a commit opin or represent you single store of legs 10. "Or if
A "A to "-", by presenting orbitat legs, of three shipses of you die you delivers or you will be a commit opin or result as background mace, and called the section of the committee or you delivers or you have not you do not all you do not not consider the committee or you will be about the you.

A "A to "-" by presenting orbitat legs, of the result in the considerable shading with the considerable or you will be a present or you can shad as background mace, with do not be presented up or switches further over the logs, the righten can be presented up or switches further over the logs, the righten can be presented up or switches further over the logs, the righten can be presented up or switches further over the logs, the righten can be presented up or switches further over the logs, the righten can be presented upon a switches further over the logs, the righten can be presented upon a switches further over the logs, the righten can be presented upon a switches further over the logs, the righten can be presented upon a switches further over the logs, the righten can be presented upon a switches further over the logs, the righten can be presented upon a switches further over the logs, the right management of the logs of the logs

#### SPACE ATTACK by Cliff Ramshaw

Fof the unexpanded VIC 20.

For the unexpanded VIC 20.

Space Attack is a machine code arcade quality game with extremely good graphics, and 3 saliring skill lavels.

There are four different severe of different aliens gapes shipp, with the contract of the code of the code, and the code of the



#### SPACE FORTRESS by Darren Hall

by Usafrech Hall?

The Control of Hall Service of Hall Service States of Ferrors is a motive soul season and the Hall Service Service of Hall Service Service of Hall Service Service of Hall Service Service of Hall Service Service

#### SUPER NINE by Ian Morrison and David Anderson

for the unexpanded ZX81

Altogether there are nine machine code games, all on the one tape. CANYON: you have to quide your space this along a carryon which gets promessively narrower. 40 said levels and guide your space strip levrig a compon amount your shape. 30 speed levels. ASTEROIDS: You have to guide your ship across the screen, avoiding the asteroids. 10 skill ASTIFULIUS. You make to glove poor and levels. So speed levels. ASTRO BLASTER. The object of the game is to shoot down the fireballs, asteroids, and nemy craft.

DEFENDER. The object of the game is to shoot down the enemy craft and save the

DEPENDENT. The depend on the game is to stoot own the elemby call and sake the SOUMBA! An beginning meet of passage, this objects being all the time institutionaries, the loads being the first one to make the ball 3 times. SOUMBA! The price is another incurrations is indicape, shoot down the nockets and blast SOURDENT of the price is another incurrations in the price is shoot of the price is and blast SOURCES. Chastle your own joictimes on your 1V screen, with mice out facility, also you can only your areas to the 5% professor down the relief which should be found and morrisons. FOUR THOUGHT, A two privary game, the object of which is to get four countries of your deel in a now, hostically, shortly, or of deposits of the source is an another source and the source is an another source in the source in the source is an another source in the source in the source is an another source in the source in the source is an another source in the source is an another source in the sour



ROMIK PROMISE A MINIMUM OF ONE NEW GAME EVERY MONTH

## MARTIAN RAIDER

MARTIAN HAIDER
by Cliff Ramshaw
Or top velling game for the unrepended VIC 20, Martian
Righter is a michine code, eracide quality game. You are the
relief to the control of the code of the code of the
order and the code of the code of the code of the
desired of the code of the code of the
desired of the code of the code of the
desired of the
desi different screens which advance automatically during play, superb graphics and action. User joystick, or easy to use keyboard control.



#### MOONS OF JUPITER by Dave Byrden

for the expended VFL20. With num in Six end or fix and or 16th, and or 16th, and or 16th, and on 16th, and on



## SHARK ATTACK

STHEM ATTURNS NOW.

OF CHIT MARRISHAW

OF CHIT MARR



#### SEA INVASION by Cliff Ramshaw

OF UNIT HABITSTAW
Side Headon is marbate book, a crade quality game, priviler
in concept to "Space Headon" but much better in many
in concept to "Space Headon" but much better in many
energeneous to the ball levels. It beginner, 2. Stance, 3,
each priviler in the ball levels. It beginner, 2. Stance, 3,
each priviler in the ball levels. It beginner, 2. Stance, 3,
each priviler in the ball levels in the concept to the concep



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The Tained Course of Interpretate (1231) All the Interpretate (1231) Al

1090ENDPROE 1100DEFPROCahostmove 1110EX=RND(4) 1120U3=U1: V3=V1: U4=U2: V4=V2 1130GN EX SOTO 1140,1150,1160,1170 1140U1=U1-1:S0T01180 1150U1=U1+1:60T01180 1160V1=V1-1:S0T01180 1170V1=V1+1 1180FX=RND(4) 11900NFZ SOTO 1200, 1210, 1220, 1230 1200U2=U2-1:60T01250 1210U2=U2+1:GOTG1250 1220V2=V2-1:60T01250 1240IF?(HIMEM+U2+V2#40)=251 OR ?(HIMEM+U2+V2#40)=247THEN PROCEED 12501F?(HIMEM+U2+V2#40)=160 THEN SOT01270 1260IF?(HIMEM+U2+V2\$40)=164 THEN 6SC=SSC+1 ELSE U2=U4:V2=V4:80T01280 12801F?(HIMEM+U1+V1#40)=160 THEN S0T01310 1290[F?(HIMEM+U1+V1840)=251 OR ?(HIMEM+U1+V1840)=247THEN FROC6ead 13001F7(HIMEN+U1+V1#40)=154 THEN GSC=8SC+1 ELSE U1=U3:V1=V3:B0T01320 1320PRINTTAB(U1, V1); CHR\$(223); TAB(U2, V2); CHR\$(192) 13400EFPROCdead 1350SOUND 0,-15,5,10 1360PROCend 1370PRINTTAB(7,22);CHR\$(141);CHR\$(129);"YOU'VE BEEN EATEN!!" 1380PRINTTAB(7, 23); CHR\$(141); CHR\$(129); "YOU'VE BEEN EATEN!!" 1390PRINTTAB(X1,Y1); "; TAB(X2,Y2); " . 1400PRINTTAB(0,1); CHR\$(141); "ANOTHER SAME?" 1410PRINTTAB(0,2); CHR\$(141); "ANOTHER GAME?" 1420B\$=GET\$ 14301FBs="Y" THEN 1460 14401FB\$()\*N\*THEN 1420 1450G0T0 1540 1460PRINTTAB(17,1);CHR\$(141);CHR\$(130); SKILL LEVEL? 1470PRINTTAB(17, 2); CHR\$(141); CHR\$(130); \* SKILL LEVEL?\* 1480A\$=GET\$ 1490A=VAL (A\$) 1500 IF A(1 OR A)2 THEN 1480 15105KILL=A 1550#FX12,0 1580DEFPROCINTro 1590 PRINTTAB(15,5); EHRs(141); EHRs(131); "FACHAN" 1600 PRINTTAB(15,6); CHR\$(141); CHR\$(131); "FACMAN" 1610FRINTTAB(10,10); CHR\$(130); "CONTROLS" 1620FRINTTAB(10,12); "'M" - UF"; TAB(10,13); "'I' - DOWN'; TAB(10); 1630PRINTTAB(12,18); CHR#(129); "SKILL LEVEL(1 OR 2)?" 1650A=VAL (A\$) 1660IF ACT OR A>2 THEN 1640 1680PRINTTAB(10,23); CHR\$(131); "HIT ANY KEY TO CONTINUE"

1640A\$=GET\$

16703KILL=#

1760ENBPROC

VARIABLES FOR PACHAN A - VALUE OF AS FOR SKILL INPUT AS- UTILITY VAR. FOR KEYBOARD INPUT AL- IST DATA LINE NO. RX- LAST DATA LINE NO. CI- STEP SIZE FOR DATA DI- MAZE COLDUR EX- RANDOM VAR. FOR 1ST GHOST MOVE FI- RANDOM VAR. FOR 2ND GHOST MOVE 1%- COUNT VAR. FOR DATA JY- COUNT VAR. TO READ DATA INTO 'K' K - ARRAY FOR STORE OF DATA MI- VAR. FOR MAZE SET-UP NI- VPOS FOR MAZE SET-UP PI- YAR, FOR PACMAN CHAR, NO. SI- HORIZONTAL VAR. FOR DOTS SC- YOUR SCORE GSC-NO. OF DOTS EATEN BY GHOSTS HSC-HIGH SCORE SHEET-PRESENT SHEET NO. SKILL-SKILL LEVEL TI- VERTICAL VAR. FOR DOTS U1- HORIZONTAL POS. OF 1ST GHOST U2- HORIZONTAL POS. OF 2ND SHOST U3- STORE OF DLD U1 FOR SCREEN CHECK U4- STORE OF DLD U2 FOR SCREEN CHECK VI- VERTICAL POS. OF 1ST GHOST V2- VERTICAL POS. OF 2ND GHOST V3- STORE OF OLD V1 FOR SCREEN CHECK V4- STORE OF OLD V2 FOR SCREEN CHECK II- HORIZONTAL POS. OF PACHAN 11- STORE OF OLD IX FOR SCREEN CHECK YI- VERTICAL POS. OF PACMAN Y1- STORE OF OLD YX FOR SCREEN CHECK



Meet our not so simon ple Simon. He'll chalol lenge you to crack T his mind boggling so code which consists of a series of musical notes and lights. All you have to do is keep up with him! This game is based.

on the electronic wy
of the same name.
The aim is to repeat a
sequence of random
ly produced notes
and lights correctly.
Each time you comsplete a round the
computer adds an excomputer adds an exded tra note/light to the





# LOGGER

Squaaaaarrrrkk! There goes that pesky bird, flying off with my axe agin! Ah tell you, I ain't goin' to stand for it much longer. That feathered varmit keeps on swoopin' down on me and stealing my axe.

How can a lumberjack work without his axe? He can't that's the answer! But don't worry I'll get even with that bird if it's the last thing I do . . .

You take the part of this pestered lumberjack and help get his axe back from the feathered fiend. To do this you have to guide your man through a maze of logs and ladders. You climb up the ladders and leap over the logs on your way to catch the bird. The game is similar to that arcade game with the crazy gorilla—as you've probably guessed.

Control keys are: 'D' to climb; 'Z' and 'C' left and right; space bar to jump.

The game is split into two
parts. The first lists the instructions and makes the

parts. The first lists the instructions and makes the characters. The second is the game and needs the 3K expander.

Brian the author reckons that the game has enough memory to enable Vic owners with moderate programming skills to work out their own screens of platforms and ladders once they get bored with the existing one. So pick up your axe and head for the trees and keeping an eye out for that pesky bird.













#### LISTING 2

5 BPS="BBONUS MINNEPOINTS MINNES

GOSUB1000:PRINT"J" 9 FORL1=38488T038488+586:POKEL1,2:NEXTL1

14 R15="1001" : R25="11" : PL5="

15 GOSUB600: ONPFGOSUB400, 430, 450 19 TI\$="800000":TM\$=TI\$:PB=BP

28 LG=7775: DR=2:00SUB68 22 GOSUB300

23 1FL0(=7775ANDPEEK(L0-22)=31THENPOKEL0,31:00T028 23 IFLUC=7775THENPOKEL0,32:00T020

25 K=PEEK(197) 38 IFK=64THEN48

- 32 IFK=330RK=340RK=32RNDHC\33THENGOSUB658 36 IFK#189NDPEEK(MN-Z2)#31THENGGSUB750
  - 40 IFVAL(TI\$)YAL(TM\$)ANIPB)8THENPB=PB-10:TM\$=TI\$ 41 PRINTSC#SC:PRINT\*# TAB(15)BP#PB\*# 41 PKINISUPSU PKINI # IND.13/2FPF # 42 IFSC\* PMINISMCSTHERMINM+1: EM=EM+8888: GOSUB685: GOSUB612
- 43 IFPEEK(MN+44)=320RPEEK(MN+44)=59THEN800

44 IFMN=C7753THENSOR 45 IFLG/MN+35RNDPEEK(LG-22)\*31THENPOKELG,31:00T020 46 IFLG: MN+35THENPOKELG: 32: G0T020

49 IFLG(8140THENPOKELG, 32:00T022

68 POKEMN, H: POKEMC, 8: POKEMN+22, B: POKEMC+22, 8: RETURN

TO POREINE IN FUNERAL TO FUNERANCE IN FUNERANCE OF RELIGION OF POREINE 22 POREINE AZZ 2 PRETENT AZZ 2 POREINE AZZ 2 PRETENT AZZ 182 PB=PB-188: IFPBC8THENPB=8

300 POKELG,32:IFDR=1RNDPEEK(LG+22)<>32THENLG=LG-1

- 306 IFDR\*29NDPEEK(L0+22) C)32THENLG=L0+1 307 IFPEEK(LG+22)=32THENFL=1
- 389 IFFL=1ANDPEEK(L0+22)=32THENL0=L0+22 310 IFFL=1RNDPEEK(LG+22)<>32THENFL=2:009UB325 311 IFIR=1RNIPEEK(LG-21)=31THENPOKELG+1,31

312 IFDR=29NDPEEK(L0-23)=31THENPOKEL0-1/31 314 IFLG=MN+22THEN887 319 POKEL9,0

328 IFPEEK(LG+22)=HTHEN887 324 RETURN 325 IFDR\*2THENDR=1:00T0327

326 IFIR=1THENDR=2 400 PRINT"N"LEFT\$(PO\$,6)R2\$PL\$LEFT\$(PO\$,10)R1\$PL\$LEFT\$(PO\$,14)R2\$PL\$LEFT\$(PO\$,18 )R1#PL#

401 PRINTLEFT\$(PO\$,22)PL\$":::"; 483 POKE7887, 47: POKE7882, 47: POKE7983, 47: POKE9858, 47 404 FORT=22T066STEP22: POKE7687+1, 31: POKE7882+1, 31: POKE7983+1, 31: POKE8058+1 31: NE

428 RETURN 432 PDKE8861.59:PDKE8861+CL.6:PDKE8868+CL.6:PDKE8868.59:PDKE7979.59:PDKE7979+CL.

434 POKE7974+CL, 6: POKE7974, 59: POKE7892, 59: POKE7892+CL, 6: POKE7885, 59: POKE7885+CL

436 POKE7901,59:POKE7901+CL,6 440 METUREN 498 PRINT"M"LEFT\$(PO\$,6)R2\$LEFT\$(PL\$,14)LEFT\$(PO\$,18)R2\$"\$\$"LEFT\$(PL\$,14)

451 PRINTLEFT\$(PO\$,14)R2\$"BB"LEFT\$(PL\$,16) 485 PRINTLEFTS(POS, 22)PLS"

600 PRINTLEFTS(PO\$,4)"M (="LEFTS(PO\$,5)"M 89"BRS 683 RESTORE:FORI=1T02:RERDP1.P2:POKEP1.37:POKEP1+38728.7:POKEP2.38:POKEP2+38728 4:NEXT 684 DATA8121,8852,7876,7945 605 FORI=1TONM+1:POKE7707+1,32:NEXT

606 FORI=ITONM:POKE7707+1,36:POKE38427+1,5:NEXT 612 FORLO=1T015:POKE36875,158:POKE36879,42:FORD=1T058:NEXTD:POKE36875,8:POKE3687

614 FORD=1T028: NEXTD, LO 628 RETURN 658 GOSUB78

651 IFK=33THENMN=MN-1:H=29:B=38:MC=MC-1 652 IFK=34THENMN+MN+1:H=27:B=28:MC=MC+1 654 IFMN=>8119THENMN=8119:MC=38839 655 IFMN=9897THENMN=MN+22:MC=MC+22 656 [FPEEK(MN+22)=370RPEEK(MN+22)=38THENGOSUB68:GOSUB748

```
658 IFK=32THENGOSUB788
662 1FH#299NDPEEK(MN-21)=31THENPOKEMN+1.31:POKEMN+23.31
664 IFH=279NDPEEK (MN-23)=31THENPOKEMN-1,31 POKEMN+21,31
667 IFPEEK(MN+44)=59THENGOSUB100
668 IFPEEK (MN+44) = 32THEN888
669 POKE36877, 283: POKE36877. 8
675 POKE198, 8: RETURN
700 IFH=29THENMN=MN-23:MC=MC-23
    IFH=27THENMN=MN-21:MC=MC-21
782 GOSUB68: IFMN+44=LGTHENGOSUB738
783 | IPPEEK(MN+66)=59THENPOKEMN+66,32:POKEMC+66,2:GOSUE738
785 [FH#29NIDFEEK(MN+1)=31THENPOKEMN+23,31:POKEMN+45,31:605UB388:605UB78:60T0789
786 IFH=27RNDPEEK(MN-1)=31THENPOKEMN+21,31 POKEMN+43,31 GOSUR388 GOSUR78 GOTO718
789 IFH#29THENMHMH421:MC=MC+21:IFJM=1THENPOKEMN-21.31:POKEMN+1.31:JM=8
713 IFPEEK(MN+22)=370RPEEK(MN+22)=38THENGOSUB748
719 GOSUB68: IFHN=88970RINN=8896THENSOSUB78: MN=RN+22: MC=RIC+22
 738 SC=SC+48:PDKEMN+88:39:PDKEMC+88:8:FDRS=148TD288:PDKE36874;S:HEXT:PDKE36874;8
 731 POKEMN+88,32: IFPEEK (MN+66) #47THENPOKEMN+88,31: POKEMC+88,2
 748 POKEMIH-66, 48: POKEMC+66, 8: SC+SC+88: POKE36874, 225: FORD=170188: NEXT: POKE36874, 2
 741 FORD=1T0108:NEXT:POKE36874.8:POKEMN+66.32:POKEMC+66.2:RETURN
 750 H=33: B=34: FORI=1T04: MN=MN-22: MC=MC-22
     IFI=1THENPOKEMN+44,31 POKEMC+44,2
 752 POKE36977, 228: POKE36877, 215: POKE36877, 8
  753 GOSUB68: GOSUB388: POKEMN+22, 35
  754 IFIC4THENPOKEMN+22,31:PGKEMC+22,2
  755 IFI=4THENPOKEMN+44,47 POKEMC+44.2
  756 1FL83MN+35THENPOKEL8,32:L8=7775:1R=2
  757 IFL078H358NIPEEK(L0-22)=31THENPOKEL0.31:L0=7775:DR=2
  767 IFLOC=7775THENPOKELG.32:LG=7775:DR=2
  76/ IPLG<=7775HENPUNELU:32:LU=7775:DR=2
768 IPLG<=7775ANDPEEK(LG=22)=31THENPOKELG:31:LG=7775:DR=2
  778 NEXT1: POKE36877, 228: POKE36877, 215: POKE36877, 8: RETURN
  800 POKEMN, 32 POKEMC, 2 MH=MN+22 MC=MC+22
  884 IFPEEK(MN+44)=58THEN887
  886 GOT0888
  888 POKEMH422+1,63:POKEMC+22+1,8:POKEMH+22.62:POKEMC+22.8:POKEMH,32
  003 00038941
818 POKEMN+22+1,32:POKEMC+22+1,2:POKEMN+22,32:POKEMC+22,2:POKEMC,2:00T0819
  813 POKEMN+22-1,62 POKEMC+22-1,8 POKEMN+22,63 POKEMC+22,8 POKEMN,32
   815 POKEMN+22-1,32:POKEMC+22-1,2:POKEMN+22,32:POKEMC+22,2:POKEMC,2
   819 NM=NM-1: GOSUB685: IFNM=8THENS
828 POKEL0: 32: H=29: B=38: POKEL0+38728: 2: POKE198: 8: 90T014
   821 DATA195,888.8.88.195,588.8.88.195,288.195,888.8.282,588.281,288.8.89.281
   688 195
   824 DATA200, 0, 80, 195, 600, 0, 80, 195, 200, 0, 90, 195, 1000, -1
   826 READD:POKE36875, P:FORN=ITOD: NEXT: POKE36875, 8:FORN=ITO28: NEXT: GOTO825
   900 FORI=4T01STEP-1
   983 IFI)2THENPRINTLEFT$(PO$,I)TAB(4)BR$
    905 IFI=2THENPRINTLEFT$(PO$,1)TH3(4)LEFT$(2R$,8)
906 IFI=1THENPRINTLEFT$(PO$,1)TH3(4)LEFT$(2R$,3)
    907 IFI(STHENPRINTLEFT$(PO$, I+1)TRB(4)
    987 IFICSTHENFRIMENTD, I
988 FORD=170588:NEXTD, I
988 FORD=170588:NEXT
    71: PURL"1100-FRINI # IROXID: -FURL"110200 PEN:
918 PRINT"##TR8(15)"80NUS":FORM=100T0235STEP2-POKE36976,M:-POKE36976.0:NEXTM.L
                                       *:F0R0=1T0200:NEXT
    921 FORJ=1TOPBSTEP10:SC=SC+10:P8+P8-10:P0KE36875.235
    922 PRINTSC#SC:PRINT"#THB(15)BP#PB"H
    923 [FSC=>BMRNDNMCSTHENNM=NM+1: BM=BM+9888: GOSUB685: GOSUB612
    924 POKE36875, 0: NEXTJ
    940 PP=BP+500:FORD=1T01500:NEXT:00SUB70:P0KEL0:32
    941 IFBP=4000THENRP=1000
    942 PF=PF+1: IFPF>2THENPF=1
    958 GOT014
    1000 POKE198.0:PRINTCHR$(8) "200 @
                                               88 88"
                                            1009 PRINTING(6)*8
     1001 PRINT" 8 8 8 8 8 8 8
                                             1010 PRINT" 000 0000 000 000
     1882 PRINT" 8 8 8 8
                                             1011 PRINTTAB(6)"8 8 8"
    8 8"
                                             1012 PRINTTAB(6)*8
                                             1013 PRINTTRB(6)"8898 8 8"
                                             1014 PRINTTAB(5) "MIPRESS A KEY" : POKE198.0
                                             1015 GETRS: IFRS=""THEN1015
     1005 PKIN: 0000 00 00
1007 PRINTTAB(6) %00000 000
                                             1040 POKE36879, 191: RETURN
     1888 PRINTTRB(6)"9 9 9"
```











# C & VG SOFTWARE FORM

Have you written a games program which you feel is just right for C&VG? If so we have come up with a form to ensure that we can test it out and give you our views on it, as we have all the information we need to present it properly in quickly as possible.

We would prefer a tape and listing but can work from just a tape and will return it to you if it doesn't find its way into the magazine. We will also need an additional sheet explaining the game and its theme. And any documentation like lists of variables or how certain routines are working. would be of great help to beginners.

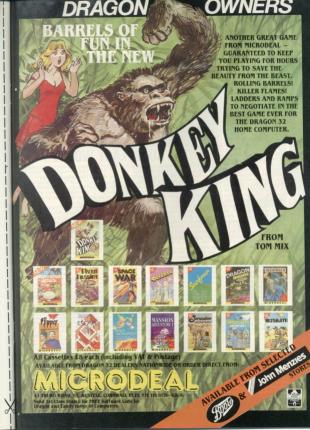
Program name: ..... 

This form will merely help us to keep a check on your game as it goes through our testing process and make sure

If you don't want to cut up the magazine, we will accept photocopies or close copies of this page. This form will be appearing regularly in C&VG issues from now on

Remember we pay £10 for each listing published and you could win our Programmer of the Year Contest where we will try to turn the winner into a best-selling games author.

ould run on:	needed to run it:
ner equipment (joysticks, Extended sic, add ons, etc.) needed to run it:	
Christian uthor's name:	Sur- name:
ddress:	
	Deter
Tel:	Date:
ype of game: (If original please say so)	
oading instructions:	
iame instructions: (If not included in the listing)	
	-Office use only
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Date received:  Acknowledgement sent:  Name of evaluator:  Date sent out:	— Office use only  Evaluator's comments  Good enough to publish  Needs some tidying up  Not worth publishing  Same game
Date received:  Acknowledgement sent:  Name of evaluator:  Date sent out:  Date due back:  Needs to be returned to	Consider the second of the sec
Date received:  Acknowledgement sent:  Name of evaluator:  Date sent out:  Date obe refurend to be refurend to	Evaluator's comments Good enough to publish Needs some todying up Not worth publishing Same game already published





# MARVELL OUS MFRCHANT

galaxy for March. Their fleets superbly marshalled by a top merchant, David Jones of Grovesnor Park Gardens, Cliffe Lane. Leeds, have taken the lead in the battle for control of a Colecovision prize.

While many players fought their way through the gateway routes trying to find a route not crowded by pirates, the Dictaria cleverly took advantage of the galactic need for goods, including shipping much-needed supplies to wealthy Rorul which notched up a massive 595 trade

index. The way the wily Dictaria usually Moved before making the critical Trade showed how much thought their commander had put into the name this turn. We will be contacting David to arrange a shipment of software to Leeds.

Our top 10 scorers were: David with 2738 profit; D. Speight, Carleton, 2261; S. Peattie, Leeds, 2097; S. Chambers, Norwich, 1972; C. Rennison, Uxbridge, 1857; J. Fowler, Ewell, 1856; G. Brown, Washington, 1835; D. Moore, Gateshead, 1834: A. Jones, Heaviley, Stockport. 1830: R. Hutchin, Bishop's Stortford, 1776.

To have some better idea of how you fared, check your score against the following table: 239 players scored above 500; 400-499, 58 players; 300-399, 53 players: 200-299, 63 players: 100-199 76 players; 0-99, 1173 players, and 1781 players scored below 0

## STARLORD CHANCE

Mike Singleton, who wrote the Seventh Empire program runs his own play-by-mail game, Starlord. Should you want to try your hand at a very different kind of galactic combat, Mike is offering all Seventh Empire players a

chance to take part in Starford. Two free turns and a free rulebook will go to anyone who wants to take up his offer.

Just write to Mike at his address, which is given in the Seventh Empire Rulebook and quote your Seventh Empire code number for a free introduction to the worlds of Starlord.



# THE BUGS' LAST WORD?

interference in The Seventh last turn. Empire could result in extradition moves to return them to Techno-Drac's Castle, but they couldn't resist.

Snag Jnr. just reversed titles on the Plunder and Cargo Gateway Route figures. The result: we printed them the wrong way round in our March issue. This time the Black on White figures really do relate to the successful Cargo routes, while the Plunderers are printed white on black and take up most of the table (see below).

The computer will not allow the first. empires to give Imperial Ships to players with a profit of nought or less. Many of you phoned up for "Lost in Space" fleets. But claiming ships last time and the overall the entry this turn was

Imperial Ships start off-board and only move on when a player has claimed them. Those claimed

this turn are shown below. The most common errors this month came from players who three. Attacked or Raided diagonally.

Also beware of issuing a Trade order to a star system of the same type as the one you have And remember that you can

only Attack in the second movement phase if you staved in your own empire's star system during Remember to check your

orders and make arrangements confusion was such that we very good. The Raid Penalty for Chambers, Norwich.

We did warn the Bugs that any I have decided not to award ships I turn three will be "1". The deadline for orders this month is Wednesday March 23rd. Finally we have to call a halt

on entries for the time being. Our discs will be filled this time as we have new entries aplenty for turn

Pictured above is the Colecovision which will go to the name's overall top scorer after the first six months.

## IMPERIAL FLEETS

D'taan Empire: K. Gadman, Portisac, Cornwall. Sun Empire: R. Archer Taunton Pirate Empire: P. Nevins, Warrington, Bloodline Empire: S. Birch, Whitby. Dead Empire: D. Speight, Carlton. Amethyst Empire: B. M. Jones, Diss. Water Empire: S

	As	Ra	Ca	Du	Er	Fa	Ga	He	lx	3	Ko	U	Mu	Nu	Op	Pu	Qa	Ri	So	Tu	Us	Va	W	Xu	Yu
Anni	_	500	250	E003	259	333		250	1000		200				250	100	250	500	250		333	14		208	250
Bacov	500		333	333		83	500	500		125	500	1000	500	166			500								166
Carsw					100					156	500		83	111	200	142	50		250	500	166	1000			560
Dusup	155	333	-50		250	155	251	500	125						166		500			_	-			155	166
Erak	1000			100				125	500			7	165	83		500	333		333	1000	1000	Ц,	1000	186	-
Fadis	ESS.	500	1000	503	500		1000	55	258					333	1000	500	1000		200	100		166	1000	63	200
Gazor	500		-71	1	386	12		333				500		_								209	236		1000
Hezad	333	250	500							250		100		500			66						200	166	1000
hip		125	166					201			254 500			333			500					186	-"	195	=
Jinis			100	254	- 55	111	-40	156									250					500	_	144	250
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Mupip		200	500	333	333															-		188		500	500
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Pulud	83	333	- 56	300	_			100			1100	-	586	333	-	_				200		_	_		200
Gavov		900	- 696	125	_						1000				_	200	1000	_		100	-	333	333		250
Rower	100	٠.	-	250			50		52		-	333	166				1000			254		164		142	1000
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Descri	100	100	500		991	31	19	250	B32	71	100	500	166	- 55	100	100		166	18¢	66		333	259	254	100
Vacua	100	160	531	111	166	- 11	12		- 50		123	100	150	500	100	1000	333	500	166	259	500				
Widos	-	31	160	111	150					501	500		500	100	500	333	1000		333	250		500		250	333
Eugad	•	250	150	500	11000	33	11	100				500			590	=111		500				3.2	100	0	1000
Yunga	-		25	100	1000	62	33	50						100		166		100	500	12	500	200	500	J 125	

# BATTLE REPORTS

Some 63 star systems were disrupted by the clamour of battle in turn No. 2 with the defenders holding out each time.

Once again the closest battle came at Olex which barely held onto Sun citizenship against a vast Pirate army from the neighbouring three systems. The conflict inflicted heavy

The conflict inflicted neavy losses on the defenders who all took a -4 knock to their fleet's total. But in the light of this latest conflict, the two empires have declared a peace treaty for turn three.

The following system defenders suffered losses as a result of their valiant defences: Hazan, bonus —4; Rurus, bonus —3; Olex, bonus —5; Sidal, bonus —2: Hakub bonus —4; Apel.

-2; Hakub, bonus -4; Apel, bonus -4; Rolek, bonus -4; Opod, bonus -1; Tubox, bonus -3.

Three systems' defenders managed to salvage a profit from defeating wealthy attacking ships: Xokeg, bonus 2; Meden, bonus 3; Otan, bonus 2.

A few changes to the Diplomatic Diagram this turn. As already noted, a peace treaty has been negotiated between the Pirates and the Sun Empire. The Amethyst Empire has also declared

peace with D'Taan's Empire.
The D'Taan's Empire has declared war on the Water Empire and the Pirate Empire. The Diplomatic Diagram below shows the changes. When a line connects two empires they are at war during

Name:

FLEET 6

turn three.
Looking ahead for likely trouble spots
this turn, D'Taan's Empire's new foes may



The Diplomatic Diagram

FO	ZUZ	LARUB	YIBET	XOLIP	ITIL	FUNUS	LULIP	YANOK	XOKEG	ISOX
	0				*					
285	11	190 731	227 84	ABOB	SONER	VEPOZ	OATOT	HEZOD	ASOL	SUXEK
	CAX	QIRUS	HAZAN	ABOB	*	*	0	*	*	
210		270 348	163 168	153 216				429 96		259 352
BA	ROV			MUPIP		BETID	WAVAB	RIVEV *	MEGUD	NABOK
	*	*		* 47	0	WG 200		365 47		217 37
333	NI IV	OLEY	TASAT	CAZUV						GOTEG
Di	W			*						
164	200	236 400	201 335	329 108	220 300	211 290	265 313	278 15	197 111	156 331
	RAK	KOVEP	USUG	PEBOB	JADEG	ENAK	KEPAR	UGON	POROV	*
	*	151 141	200	182 101	200 186	212 66	208 248	237 216	195 285	367 .40
F	ADIS	LOKIK	YUSES	XAPUS	IXIP	FAGIL	LIZAG	YODAZ	XUGOD	IBED
	*		*	0	*		*		*	
407	- 6	254 231	299 95	26 %	CIDAL	VIZET	OAVUV	HAKUB	APEL.	SABAG
	ASUX	QUXIN	HIPEB	ASUK	SIDAL		*	0	+	*
289	65	175 7	204 296	194 155		185 75	916 6	164 13	330 2	171 266
В	UREP	WAGAP	ROLEK		NUVEX		WUPIV	RORUL	MEDEN	NUZET
	*		*	0	12	0	153 45	223 59	173	8 299 75
162	100000	OBOD	TUROY	CIGER	GAZOR	DABAG	OTAN	TUXUX	CESER	GIRIX
D	*	*	*	0	*			0		100
259	3	272	333 6	192 5	5A1 7	7 212 30	180) 19	6 221 6	O 2722 21	213 47
		KERUP	ULEB	PIRAD	JAXEL	EDIB	KOLOI	UKOP	*	JUVAK
	0	*	177 43	191 30	260 25	183	H 305 S	130 10	0 397	195 330
		122				_			1	

Salactic Map		 
	Orders in Block Caps please	

I wish to move the ...... Empire's Imperial Ship from ...... to

Please notify us separately of any change of address.

# ESSENTIALS OF VIDEO GAMES

To be able to reproduce the movements of three-dimensional objects in a realistic fashion is essential to

the success of many video games.

There are two essential parts to any program for doing this. They are, first, the production of a perspective view of the object and, second, the application of the rules for movement.

A solid object with straight edges can be described by giving points on its surface and the ways in which they are to be joined to form the edges of the object.

Once an object is described in this way, a perpective view of it can be drawn by applying the perspective transformation to each point that is used in the description and then joining the transformed points

The current position can be given in terms of the initial position by any set of equations with this form as long as when T=O the equations become:

XC = X YC = Y

ZC = Z

The form of a program for producing movement of three-dimensional objects can now be given. If the object itself is described by a number of groups of four items of data, X, Y, Z and I in which X, Y and Z give the co-ordinates of a point and I indicates whether the point is joined to the previous one by edge.

The indicator, I takes the value 1 if there is an edge and is 0 if there is not. The form of the program is:

Once three-dimensional shapes can be created and put into movement, the ways in which they can be used in video games are almost endless

Imagine a three-dimensional Pacman gobbling up everything around him. In a video game, this is nothing more than a shape that is showing a simple pattern of

In the same way, three-dimensional Space invaders can be created that can distort themselves so as to avoid missiles fired at them in ways other than moving bodily in one direction or another. There is no reason why the shapes that

are created should be confined to artificial ones such as those of a Pacman or a

Given the high resolutions that are available with most microcomputers, there is no reason why realistic threedimensional human figures, for example, uld not be created and made to move. These could be superior to the figures that are seen in basketball and football

video games at present. A good deal of data is needed for the creation of such an image. However, once

the data is assembled and stored the bulk of the work is done. The data can be placed in data stateents, but it is much simpler to share it between other programs if it is stored in a

When it To create number of progr s spreading the work needed initia create the file.

Fig 1: Here a cube is distorted using the rules given.

in the same way as the actual points are joined.

The rules for the movement of the points on the object can be expressed by giving the position of the point at any time. T, in terms of

its initial position at T=O. If the co-ordinates of the position are denoted by (X, and those of the current position by (XC, YC, ZC) then the rules for movement can be written, for

example, as: XC = X + T\*YYC = Y

ZC = Z

For each group of data items: Read X. Y. Z and I Apply movement rules to give XC.

YC, ZC Find transformed point correspond-

ing to (XC,YC,ZC) If I=1 then draw a line to this point If I=0 then move to this point

A program based on this scheme which deals with an object described by N groups of data which is viewed from a distance D is shown in Fig 2.

The results that can be produced with this program when N and D are initialised and data are added are illustrated in Fig 1.

FOR T=0 TO 8 10 20 FOR K=1 TO N

30 READ X,Y,Z,I 40 XC=X + T\*Y 50 YC=Y

60 ZC=Z 70 XT=XC/(1 + ZC/D)

80 YT=YC/(1 + ZC/D)

90 IF I=1 THEN DRAW XT,YT 100 IF I=0 THEN MOVE XT.YT 110 NEXT K

120 RESTORE 130 NEXT T

Fig 2: The program

Programming with Graphics, a new book by C&VG's graphics writer Garry Marshall, has just been published by Granada at £5.95. It has chapters on each of block graphics, pixel graphics and line graphics, which explain the basic programming techniques and gives many programming

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# MACHINE!

# YET MORE INSTRUCTIONS

We have already looked at conditional jump instructions, and now we turn to another set of instructions, which are often used in conjunction with these — called comparison instructions.

These comparison instructions subtract an operand from a register specified in the instruction. Only the flags are affected, the sign, zero, carry and overflow flags being changed according to the result of the subtraction.

On the Z80 the comparison instructions all work with the accumulator. The opcode mnemonic is CP, and the CMPB, CMPD, CMPS, CMPU, CMPX, CMPY, for compare with A, B, D, S, U, X, Y registers.

The operand must be of the same length as the register specified in the mnemonic, so CMPA and CMPB take an 8-bit operand and the others take a

16-bit operand.

These compare instructions are available in immediate, extended, and other addressing modes. For example, we

may have: CMPA data: Compare A with the 8-bit data provided in the instruction CMPX data: Compare X with the 16-bit data provided in the instruction

CMPB address: Compare B with 8-bit contents of address CMPS address: Compare S with 16-bit contents of address and address+1 11110101 and the twos complement is 11110110. If you perform the same process

If you perform the same process starting with 1110110 you will get 00001010 and if you add 00001010 and 11110110 you will get 00000000 (and a carry of 1), so it does make sense to regard the twos complement of a number as its negative.

The easiest way to perform a subtraction in binary (for people, if not for microprocessors) is to add the twos complement of the number to be sub-

tracted.
For example, to calculate 00001000 —
00000111 (decimal 8 — 7) we first calculate the twos complement of 00000111,
which is 11111001, and then calculate
00001000+11111001, which gives
00000001 (and a carry of 1).

The 6502 actually uses this method of subtraction internally, so the program fragments

SEC LDA 8 SBC 7 and LDA 8 CMP 7

would leave 1 in the carry flag.



addressing modes we can use with this mnemonic include: CP data: Compare the accumulator with

the 8-bit data provided in the instruction.

CP register: Compare the accumulator

with one of the registers A, B, C, D, E, H, L. CP (HL): Compare the accumulator with

the contents of the memory location whose address is in the register pair HL. The 6502 and 6809 allow comparison

with other registers as well as with the accumulator. On the 6502 we have the mnemonics CMP for compare with accumulator, CPX for compare with X register, and

CPY for compare with Y register. The addressing modes we can use with these mnemonics include:
CMP data: Compare the accumulator with the 8 bit data provided in the

instruction.

CMP address: Compare the accumulator with the 8-bit contents of the 16-bit or 8-bit Zero Page address.

Similarly we have CPX data, CPX address, CPY data, and CPY address. The 6809 has the mnemonics CMPA, BY TED BALL

TRUE AND FALSE FLAGS

The effect of a comparison instruction on the zero flag is quite straightforward: the zero flag will become 1 (meaning true) if the numbers being compared are the same, and 0 (meaning false) if the numbers are different.

The effect on the other flacs is more

complicated, and to understand what happens we have to look at the details of twos complement arithmetic. You will remember that the Z80, 6502 and 6809 treat binary numbers with a 1

in the leftmost position (bit 7 of an 8-bit number or bit 15 of a 16-bit number, starting the count from bit 0 on the right) as being negative. We can negate a number by first calculating the ones complement (by

changing 0s to 1s and 1s to 0s) and then adding 1 to get the twos complement. For example, if we start with the binary number 00001010 (equal to decimal 10) the ones complement is

# PERFORMING SUBTRACTION

The Z80 and 6809, however, perform direct subtraction with borrow, giving a carry which is the opposite of the carry resulting from the twos complement and addition method. Thus the fragments

> Z80 LD A,8 SUB 7 and LD A,8 CP 7 6809 LDA 8 SUBA 7 and

CMPA 7
would leave 0 in the carry flag.
Subtraction of binary numbers using

Subtraction of binary numbers using borrows (corresponding to the way we perform subtraction of decimal numbers) is complicated because of the difficulty of keeping track of the borrows, which may extend over several places.

It is much easier to perform a twos complement and addition, and if you are using a Z80 or 6809 remember to complement the resulting carry.

After an addition, subtraction, or comparison instruction, the sign flag will be the same as the leftmost bit of the result (bit 7 in an 8-bit operation, bit 15 in a 16 bit operation), 0 meaning positive and 1 meaning negative.
Thus, in the preceding example (8-7)

the sign flag would become 0, while 7-8 would leave 1 in the sign flag.

Our microprocessors use a fixed number of bits in their calculations, but the results may require more bits than are available.

# CARRYING THE FLAG

The carry flag is used to record the carry from the leftmost bit, and this is all we need in unsigned binary arithmetic (where we regard the 8-bits as representing numbers from 0 to 285 decimal). However, in signed binary arithmetic the sim and carry flags are not enough

to tell us whether or not the result has the correct sign. Consider the calculation of decimal 70+80 in signed binary:

+ 80 +81010000

150 (0)1001010 = -106 decimal
Adding two positive numbers has
grant a negative answer, because the
carry from bit 6 has gone into the sign

bit.

We get a similar result from (-70)+

(-80) -70 10111010 +-80 +10110000

-70

-150 (1)61161010 =+106 decimal
In this case adding two negative numbers have given a positive answer.

Ders have given a positive allower.

The same kind of thing can happen with subtraction, for example -70-80 (should be -150), and 80-(-70) (should be +150)

os complement of 80 +10110000 (1)01101010 =+106 decimal

+twos complement of -70 01080110 (0)10010110 = -106 decimal

# THE WRONG INDICATIONS

The overflow flag is used to indicate when the result of a signed binary calculation has the wrong sign because 8 or 16-bits is not enough to record the correct signed binary answer.

correct signed binary answer.

The overflow flag will become 1
when the result of an 8-bit addition,
subtraction, or comparison is more than
+127 decimal or less than -128 decimal, and 0 otherwise.

Similarly, a 16-bit operation will give an overflow of 1 if the result is more than +22767 or less than -32768, and an overflow of 0 otherwise.

The value of the overflow flag can be calculated from the carries from bits 6 and 7 in an 8-bit operation, or bits 14 and 15 in a 16-bit operation. The overflow will be 1 if the two carries are different and 0 if the two carries are the

# TRANSLATING LANGUAGE

Now that we know how to work out what the flags will be for the various cases = , , , = , we can translate these IF ... THEN ... statements into assembly language (but needing several lines to replace the single line of

Basic)
There is no difficulty in testing for =





# SIMPLE TESTS FOR RELATIONS

The 6809 has an extensive set of conditional branch instructions, allowing us to make simple tests for all of the relations =,<>,<,<,>,<=,>=.

We have BEQ for =, BNE for <>, BLO or BCS for unsigned <, BLT for signed <, BH for unsigned <, BLT for signed <BH for unsigned <=, BLE for signed <=, BLS for unsigned <=, BLE for signed <=, BHS or BCC for unsigned <=. BCC for unsigned <=. BCC for unsigned <=. BCC for signed <=. BCC for signed <=... BCC

With the more restricted conditional branches or jumps on the 6502 and 280 some relations are difficult to test, but they can all be worked out if you understand the principles of binary arithme-

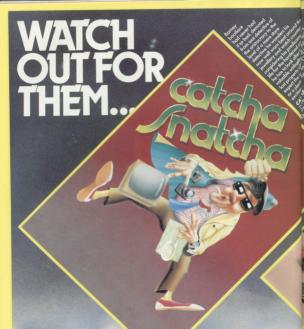
tic.
For example, consider the problem of testing for signed<.</p>

If M<N we will get M-N<O (sign flag 1) when there is no overflow (overflow flag 0), and M-N>O (sign flag 0) when there is overflow (overflow flag 1). For this test we will therefore need to do something like:

6502		LDA M CMP N BVC L1 BPL LESS
	NOTLESS	
L1	BPL NOTLESS	
	LESS	
Z80		LD A,M
		CP N
		JP PE, L1
		JP P, LESS
	NOTLESS	
	L1	JP P, NOTLESS
	LESS	







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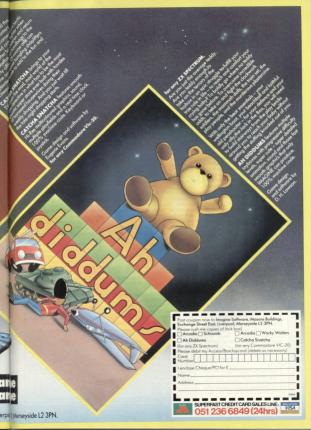
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# LOGIC CHIPS, PHASE CLOCKS One of the main problems associ-

ated with some of the newer microprocessors is that they seldom have a phase 2 clock.

This is really of no problem to kit builders as it is a simple inversion of

This is really of no problem to ket builders as it is a simple inversion of phase 1. It is quite possible that you will have in your system, either a line which is phase 2 or a spare gate on a louic chip.

It would be easy to suppose that this was a hex inverter but I will not assume that here.

In figure 1 I have indicated the way in which two popular logic

chips can be used as an inverter.

If you are unfortunate enough not to have a spare gate on any of your logic chips I would recommend using a two-input nand gate, say a 7400 or similar, as this is one of the

# most useful chips available. SMALL SYSTEMS

For those with small systems it will come as a surprise that it will be easier for you to install this timer. Of course, the chip must be accessed

using the address lines.

If you already have 64k bytes of memory installed the question becomes, where do you put the timer?

There is no simple answer to this.

The easiest way of course is to remove a lk-byte of memory somewhere. That used to be an easy job, but since the coming of 16k-by-1 and 64k-by-1 chips this is not so.

I would therefore risk dual addressing of memory and timer at the same time. The problem comes, of course, when you come to read information from the timer.

Fortunately, these days systems are built with several user ports available. Some of these will already be used by PIA's, ACIA's and other system-defined I/O's. (If you do not already use the PIA, if you have one, try the onboard clock

facility.)

There is no real problem in connecting up the address lines. Find out in hex notation where the port lies, or better in binary, and tie CSI to this line. CSO will be the line below.

For example, say the port is at 8010 hex, or 1 followed by 15 zeros in binary. Therefore you would put CS1 to line 15 and CSO to line 14.

This ties in with what I said last month, that to address the chip CSO must be at zero and CSI must be at

The register select lines could then go on any of the first ten address lines. If, for example they were put on lines 0-2 the addresses in hex would be from 8010 to 8017 or in decimal 32.784 to 32.791.

Now, with the data, address and clock lines connected you are almost ready to start timing. It is not necessary at this point to connect either the IRO or reset line.

The only necessary one left is the read/write line, again, this interfaces directly with the micro-

processor.

Once this is done you must decide on the frequency of your timer clocks. The most convenient method of deriving a lower frequency that I have found is to use a divider chin.

The CMOS 4040 is quite useful, allowing up to 12 different frequencies to be selected. Unfortunately, this is a binary counter and therefore divides in powers of 2.

Hence, for a 1MHz input you can get outputs of 500kHz, 250kHz, 250kHz, 125kHz, 62-5kHz, 32-15kHz, etc. There are a large number of decimal dividers on the market which are as handy as they usually divide by multiples or powers of ten. Unfortunately, these are not yet as common as the 7400 or 4000 series chins.

You are now ready to load into the timer and to set it in motion, (if such a word can be applied to time). You will, by now, have access to eight internal registers. I will refer to them as RO-R7.

Each timer — remember there are three — has its own control register, data latch, and buffer register.

The first, the control register lets you decide in which mode that particular timer is in. Unfortunately there is not enough room here to explain all the modes suffice to say that there is a lot of supplied information with the chip when you buy it.

## LOTS OF EIGHT

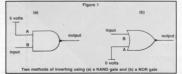
To load 16-bits into the counter two lots of eight must be entered separately. For example, to load into timer 1 write the 8 most significant bits into R2 and then the least significant bits to R3.

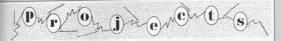
This second instruction puts both the MSB and the LSB into the 16-bit counter at the same time. Depending on the state of the control register the timer will either initialise or await an external trigger.

It is most important that the control registers are loaded with the correct bytes or else the timers will not work

Now, with this timer quite a few more programs are possible than you might have imagined. Not only can it be programmed as a tone burst generator for fault finding on such things as cassette recorders, but also can be used as a tone generator for synthesising music.

As there are three timer many more contrived sounds may be produced. The module has been designed to drive two TTL loads so you may not even need to amplify the output for playing through a normal pair of headphones.





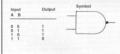
	Truth Tables
NOT gate.	

		Symbol
Input	Output	
0	1	- >
1	0	/

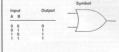
#### AND gate.

Input A B	Output	Symbol
0 0 0 1 1 0 1 1	0 0 0 1	1

#### NAND gate.



#### OR gate.



#### NOR gate.

Input A B	Out	put	Symbol
0 0 0 1 1 0 1 1	1 0 0 0		1

#### A LITTLE ON DIGITAL LOGIC

Some of you may have come across truth tables for logic gates or you may have played about with some small chips at some time or another.

In the figure below I have shown a few of the symbols which are used to represent the gates I have mentioned. There is not enough room here to cover the whole subject of digital logic so I will not try. All that I will show is a small section relevant to the project.

Above I have mentioned an inverter, a nand gate and a ripple counter, the 4040. The 4040 is too complex to mention here. The other two I will describe to you.

#### The Inverter or NOT Gate.

This is a one input, one output gate, of which a number are built into a single chip. It takes a logic level and inverts it. If a logic one appears on the input logic zero appears at the output and vice versa. This can be shown in the form of a truth table.

#### The AND Gate.

To describe a NAND gate we must first consider the AND gate. The simplest AND gate has two inputs but only one output. As you can see, for the output to be a one both inputs must be at logic one. Any other condition and the output is a logic zero.

#### The NAND Gate

Imagine an AND gate followed immediately by an inverter. This is the NAND gate. Whatever appears at the output of the AND gate is inverted as is shown in the diagram.

How to use a NAND gate as an inverter.

By taking one input of the NAND gate to the 5 volt rail so as to make it a logic one you will see that the output follows that of the NOT gate. We therefore have a NOT gate from a NAND gate, and this is why the NAND gate is so useful.

#### The OR Gate.

This is a logic gate in the same form as the AND. It usually comes in a chip package along with others of its kind. In this instance the only case when a zero is present at the output is when both the inputs are zero. If one OR the other input is a one then the output is a one, as shown in the truth table.

#### The NOR Gate.

This is an OR gate followed by an inverter or NOT gate. Whatever is on the output of the OR gate is immediately inverted for the output of the NOR gate. This is again shown in the tables.

#### How to use a NOR gate as an inverter.

Looking at the truth table for a NOR gate we can see that by taking one of the inputs to logic zero the output will be an inversion of the other input. This is also a handy gate to have around and perhaps just as good as the NAND.

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CVG 483



# CINDERELLA AND THE BEANSTALK

Every now and again in an Adventure something dramatic must happen — or it wouldn't be an Adventure!

This may be the appearance of a cryptic clue to heighten the excitement and add to the atmosphere, or the transformation in some way of an object or location.

A verb routine cannot usually achieve this end, as some of these events will be unique. For example, the transformation of mice and pumpkin into Cinderella's coach and horses will be carried out magically by the fairy godmother as soon as all necessary conditions have

This involves the mice, pumpkin, godmother and player all being in Cinderella's house at the same time.

Similarly, if there is a secret exit from the drawing room of a house via a moving bookcase, you might wish to draw attention to it occasionally by giving the clue "There's a draught coming from under the bookcase".

With a clue like that, you can make the mechanism for opening the exit quite complex, as the player will be fairly certain it is worth persevering.

Recapping on our method of screen display, we settled for setting variable Q1\$ for the computer's reply to the move, return to the start of the main game loop (Block 3 we called it) at line

This block checks for special conditions before the screen is cleared and redisplayed. It is these special condi-

redisplayed. It is these special conditions we have now got to insert. Let's tackle the clue first. We are at the top of the beanstalk we grew so painstakingly a few months ago, and

wish to display "FEE-FI-FO-FUM" whilst in this location.

The "GO" or moving verb routine cannot be used, since then the message would only appear on entry to the loca-

If we spend some time there it will not re-appear. Letting the top of beanstalk be location five (i.e. LN%=5 when there) then we can insert line 110: 110 IF LN%=5 THEN LET Q2S="FEE-LFC.PLIM".

Now when the computer has worked out the response to the latest command, it will automatically set Q2\$ to the reI sat with eager anticipation as Philosopher's Quest loaded into the BBC Model B micro in front of me. The Acornsoft logo appeared across the screen in four colours, broken by the title of the game, whilst the blocks loaded before my eyes in hex.

When the game started I was treated to silent scrolling text in black and white. OK, so an Adventure doesn't require colour or sound, but it seemed a shame not to take some advantage of the Beeb's facilities — the machine wasn't being used to the full.

Having got that off my chest, what of the Adventure itself? It starts off in a shop that has peculiar qualities.

Nothing has to be paid for, but you can only leave with two items. If the four objects lying around, keys, in my experience, were a must. So that left a choice between an aqualung, steel rod, and cup of tea that couldn't be drunk (said so in the rules).

I opted for the rod, and set off, only to find myself in pitch darkness.

Now newcomers to Adventures might be thrown off balance by having had chance to acquire a lamp. Not so those of us who have traversed the ancient pyramids, been stuck in quick-sand bogs, mauled by bears, and gone insane trying to escape from the Asylum. "XXXX XXXXXIII beld to be scape from the Asylum." XXXX XXXIII boldy typed, and I was duly rewarded!

Thereafter I proceeded to explore the labyrinth, which has many puzzles to solve. Unfortunately, in attempting to solve them I was frequently thwarted by being turned into a lettuce, ceasing to

exist, and various other nasty things.

However, restarting was not too difficult since it was only necessary to reload the database part of the program — a

task taking about a minute.

Thus, eventually I got an Albatross (no wafers!), some ripe cheese, and many

quired message if the current location is set at five. The display lines will now look like

this: 190 PRINT "YOU TOLD ME TO"; R1\$: IF LEN(Q1\$)>0 THEN PRINT Q1\$: IF LEN(Q2\$)>0

THEN PRINT Q25
Thus Q25 will only get printed if set.
Remember that these variables must be nulled (ie LET Q1\$="") after display.

BY KEITH CAMPBELL

the slides.

I've heard of but not come across the

automatic solicitor, nor recovered from ceasing to exist. I am told it is possible to do this, and the key is philosophical.

Those people I know who are into the game just give me a distant smile when I ask how near they are to completing it. Presumably their minds are miles away, philosophisimo!

Good points — cunning and complex plot. Bad point — poor response time, up to about five seconds when the machine does any serious thinking.

does any serious thinking.
Scott Adams' first adventure was my
introduction to Adventure gaming, and
although it fired my imagination, little did I

major part of my life!

The original version was written in Basic for the TRS-80 and Pet, and later translated into machine code, available for the TRS-80. Apple and Sorceror.

Like all Scott's Adventures, it has recently been released for the Vic-20 and Atari computers. This may explain why I am currently receiving a flurry of pleading letters from readers who are desperately stuck — a whole new generation of Adventurers!

It is probably the original adventure as far as micros go. I regard it as a classic, and still relive the thrill I first experienced whenever I bring it up on the screen.

The major problem in this game seems to be how to get past the thin bear. If you've got that far you're capable of completing the journey!

What do bears to to people? OK reverse roles, and then (disappointingly) rephrase it!

To those currently playing Adventureland — don't give up. It IS soluble.

If you are struggling, get together with others in the same position — Adventures are fun when played in company.

A further refinement is possible to cause the message to occur at random, keeping the player guessing whether or not the giant is about to attack, rather than risking him deciding that the messace is automatic.

sage is automatic. 110 IF LN%=5 AND RND(3)=2 THEN LET Q2\$="FEE-FI-FO-FUM"

This will bring the message up about one turn in three. Next we will see how to carry out transformations that take the game into a new phase.



# Bioscreen will help you to map out a wargame which goes beyond the borders of

Bigscreen will help you to map out a wargame which goes beyond the borders of your screen. Part four of Ron Potkin's wild west game

URING the past three articles a humber of important part and part

The largest of these is BIGSCREEN which require 4000 and although this might appear wasteful, it provides considerable flexibility and is easy to operate. It enables me to draw any map feature and save i permanently in memory so that, during the course of the game, the program is able to recall any portion of the map and display if in the WINDOW.

This method is only viable with low resolution graphics; high resolution would require a BIGSCREEN of not 4000 but 20000 or more! In this case, the alternative is to write a machine language routine which reads the contents of BOARD, selects the appropriate feature from a character set and prints it on the screen.

I am going to concentrate on a single routine. The Basic listing is quite short but is an integral part.

It is clear from the rules that the program must check a hex and its neighbours at every move. The hex that a player wishes to move to must be checked first. This can be done in Basic, but checking the six surrounding hex is slow and this is carried out in machine code. This routine is called SEARCH and is held in XS(4).

Take another look at IBOARD and BIGSCREEN. Hex are awkward to deal with and you can see the problem from the following extracts from the arrays.

This diagram shows two small parts of BIGSCREEN showing a piece on an odd row X264X and a piece on an even row X396. The six surrounding hex are shown in brackets.

	8	IGSCREE	N	
		ODD		
0		(8)		16
	(132)		(148)	
256		x264x		272
	(388)		(396)	
512		(520)		528
		EVEN		
	132		(148)	
256		(264)		(272)
	388		x396x	
512		(520)		(528)
	644		(652)	
low co	ompare t	hese wit	h the eq	uivalent

now compare these wi positions on IBOARD:

	ODD			EVEN	
0	(1)	2	24	(25)	26
(24)	(25)	26	48	(49)	(50)
48	x49x	50	72	x73x	74
(72)	(73)	74	96	(97)	(98)
96	(97)	98	120	(121)	122

Let's assume the man on x49x is to be moved in direction 1. What hex number do 1 test? It must be 25 which is 24 less than 49, but what if the man is on x73x? Then direction 1 gives 50 which is 23 less. You can see that the offsets for the two are different and depend on whether the row is even or odd i.e.:

Direction	1	2	3	4	5	6
Odd Row -	-24	24	48	23	-25	-48
Even Row -	-23	25	48	24	-24	-48

Now perhaps you will forgive me for sneaking in Line 1180! This table is in a 2 by 6 array (variable RF) and also in memory starting at RW (location 32506). RF is used in Line 500 when testing

whether the new hex is empty. Take a look at this line. Can you see how NB, the new hex position is calculated? The routine also returns NX, the contents of the hex and V2, its location in memory. RW is used by SEARCH. This is the same thino, but we do it six times. We

same thing, but we do it six times. We first POKE 6 into SS and BL is passed to the USR routine. The route will not return until it finds a non-vacant hex, when it returns the contents. These are checked and then, if necessary, XS(4) is recalled. When it has completed the search, it returns with SS equal to 255.

The interesting feature is the use of S9. The routine is really equivalent to FOR S9 = 6 to 1 STEP -1, but I cannot put this into the USR routine because each time it was entered S9 would be set equal to 6.

The answer is to set S9 to 6 in Basic and let the machine code decrement it. This is in the listing below which is annotated so that with the above explanation, I think you will find it understandable.

The Basic listing this month includes the lines necessary to load the machine code for X\$(4). Once this is done, we will be able to start on the MOVE routine. Up to now, everything I have described can be used in any wargame—even hexagonal chees—but from now on we will concentrate on the details of Warpath and get the game underway.

#### The pieces move in the following manner:,

Each piece will flicker in turn with the number of moves available. To move a piece, type a number from 1 to 6. You can remember the directions by visualising a six-hour clock.

To move northeast — Press 1
To move southeast — Press 2

To move south - Press 3 and so on.

You may continue moving in this manner until all moves are expended, but if you move next to an opponent, the piece (unless it is a Tomahawk) will flicker with "xxx" and you must stop. Neither player may enter a hex containing another piece, a boulder or any wall of the parrison.

#### WARPATH Part 4 - SEARCH

FFFFFFCCCCCCCCCCCH44H" 3030 DATA CD,7F,0A,E5,21,5D,7F,7E,3D,77,FE,FF,28,38,06,01 3031 DATA 05,4E,E1,E5,16,01,15,1E,18,4F,ED,52,38,03,3C,18

3032 DATA F9,E6,01,21,5E,7F,28,03,1E,06,19,09,06,01,05,% 3033 DATA C8,79,28,02,06,FF,E1,E5,09,11,85,78,19,7E,26,01

3034 DATA 25,6F,E6,7F,28,BE,C1,C3,9A,0A,XX 4000 LMS="..232 33 57 74"

4005 CS\$="....21547 3810 5377 6839"

4020 K=0:FORI=1T04:J=VAL(HID\$(LN\$,3XI,3)):IFJOLEN(X\$(I))THENGOS

UB4040:NEXTELSENEXT

0021 E601

00300 ROM AND 1

1010	00010	ORG	0	;X\$(4) ROUTIN
	00020   SEARCH			
	00021  START]	ING AT PI	OSITION I	N S9.
	00030   RETURN	TO BAS	IC IF HEX	IS OCCUPIED,
	00031 ;HITH (			
	00040 ;ELSE F	RETURN OF	N COMPLET	TON HITH MOI
	00050 ;59=253			
7F50	00060 S9	EBU	326050	;HEX COUNT
7FSE	00070 RM	EBU	326860	TABLE OF OFF
7885	08080 80	EBU	316690	STAKT UF IBU
BREE COTERA	00090	CALL	8A7FH	FRET BL
0003 E5	00100	PUSH	HL.	;SAVE IT
0004 215D7F	00110 AGAIN	LD	HL,S9	
0007 7E	00120	LD	A,(HL)	FRET COUNT
0008 30	00130	DEC	A	;& REDUCE IT.
0009 77	00140	LD	(HL),A	;PUT BACK
000A FEFF	00150	CP	2550	;DONE?
000C 2838	00160	JR	Z,DONE	
000E 0601	00170	LD	B,1	;REMEMBER!
0010 05	00180	DEC	В	; ANDID ZERDES
0011 4E	88198	LD	C,(HL)	<b>;</b> S9
	00200	POP	HL.	;BL
0013 E5	00210	PUSH	HL.	
0014 1601	00220	LD	0,1	
0016 15	00230	DEC	D	
	00240			
	00250			
001A ED52	00260 SUBT	SEC		;DIV BY 24
001C 3803	00270	JR	C,ROM	
001E 3C	00280	INC	A	
001F 18F9	00298	JR	SUBT	

:IS ROW 000?



0023 215E/F	00310	LD	HL, RH	OFFSET TABLE
0026 2803	00320	JR	Z, EVEN	
8828 1E86	00330	LD		; ADD 6 TO TABLE
882A 19	00340	ADD	HL,DE	
882B 89	00350 EVEN	ADD	HL,BC	
882C 8681	00360	LD	B,1	
882E 85	00370	DEC	В	
002F 4E	00380	LD	C, (HL)	;GET OFFSET
0030 CB79	00390	BIT		; NEG OFFSET?
0032 2802	99498	JR	Z,POS	
0034 06FF		LD		; NEGATE BC
0036 E1	00420 POS	POP	H.	
0037 E5	00430	PUSH		;GET BL
0038 09	00440	ADD	HL,BC	;HEX ADDRESS
0039 11857B	00450	LD	DE,BD	
883C 19	00460	ADD	HL,DE	
0030 7E	00470	LD	A,(HL)	GET CONTENTS
003E 2601	00480	LD	H,1	
8848 25	08490	DEC	H	
0041 6F	00500	LD	L,A	;PUT IN HL
0042 E67F	00510	AND	1270	;EMPTY?
0044 28EE	88528	JR	Z, AGAIN	; NO -NEXT S9
0046 C1	00530 DONE	POP	BC	
0047 C39A0A	00540	P	DASAH	;BACK TO BASIC
0000 .	00550	EMD		
00000 TOTAL S	ERRORS			
33987 TEXT (	WEA BYTES LEFT			

# WARPATH

to be continued next month

# Sinclair ZX Spectr

16K or 48K RAM... full-size movingkey keyboard... colour and sound... high-resolution graphics...

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First, there was the world-beating Sinclair ZX80. The first personal computer for under £100.

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Now there's the ZX Spectrum! With up to 48K of RAM. A full-size moving-key keyboard. Vivid colour and sound. Highresolution graphics. And a low price that's unrivalled.

## Professional powerpersonal computer price!

The ZX Spectrum incorporates all the proven features of the ZX81. But its new 16K BASIC ROM dramatically

increases your computing power.
You have access to a range of 8
colours for foreground, background and
border, together with a sound generator
and high-resolution graphics.

You have a choice of storage capa-

cities (governed by the amount of RAM). 16K of RAM (which you can uprate later to 48K of RAM) or a massive 48K of RAM. Yet the price of the Spectrum 16K is an amazing £125! Even the popular

48K version costs only £175l
You may decide to begin with the
16K version. If so, you can still return it later
for an upgrade. The cost? Around £60.



# Ready to use today, easy to expand tomorrow

Your ZX Spectrum comes with a mains adaptor and all the necessary leads to connect to most cassette recorders and TVs (colour or black and white).

There's no need to stop there. The ZX Printer –available now - is fully compatible with the ZX Spectrum. And later this year there will be Microdrives for massive amounts of extra on-line storage, plus an RS232 / network interface board.



## Key features of the Sinclair ZX Spectrum

# • Full colour – 8 colours each for

foreground, background and border, plus flashing and brightness-intensity control.

- Sound BEEP command with variable pitch and duration.
- Massive RAM 16K or 48K
- Full-size moving-key keyboard all keys at normal typewriter pitch, with repeat facility on each key.
   High-resolution 256 dots
  - High-resolution 256 dots horizontally x 192 vertically, each individually addressable for true highresolution graphics.
- ASCII character set with upper- and lower-case characters.
- Teletext-compatible user software can generate 40 characters per line or other settings.
- High speed LOAD & SAVE 16K in 100 seconds via cassette, with VERIFY & MERGE for programs and separate data files.
- Sinclair 16K extended BASICincorporating unique 'one-touch' keyword entry, syntax check, and report codes.

# rum



## The ZX Printeravailable now

Designed exclusively for use with the Sinclair ZX range of computers, the printer offers ZX Spectrum owners the full ASCII character set – including lower-case characters and high-resolution graphics.

A special feature is COPY which prints out exactly what is on the whole TV screen without the need for further instructions. Printing speed is 50 characters per second, with 32 characters per line and 9 lines per vertical inch.

The ZX Printer connects to the rear of your ZX Spectrum. A roll of paper (65ft long and 4in wide) is supplied, along with full instructions. Further supplies of paper are available in packs of five rolls.

# The ZX Microdrivecoming soon

The new Microdrives, designed especially for the ZX Spectrum, are set to change the face of personal computing by providing mass on-line storage.

Each Microdrive can hold up to 100K

bytes using a single interchangeable storage medium. The transfer rate is 16K bytes per

second, with an average access time of 3.5 seconds. And you'll be able to connect up to 8 Microdrives to your Spectrum via the ZX Expansion Module.

A remarkable breakthrough at a remarkable price. The Microdrives will be available in the early part of 1983 for around £50.





# How to order your ZX Spectrum

BY PHONE-Access, Barclaycard or Trustcard holders can call 01-200 0200 for personal attention 24 hours a day, every day, BY FREEPOST – use the no-stamp needed coupon below. You can pay by cheque, postal order, Barclaycard, Access or Trustcard.
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money-back option, of course. We want
you to be satisfied beyond doubt—and we
have no doubt that you will be.

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		m-48K RAM version	101	175.00	
	Sinclair ZX Printer		27	59.95	
	Printer paper (pack	of 5 rolls)	16	11.95	
	Postage and packing	ng: orders under £100	28	2.95	
		orders over £100	29	4.95	
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# ZX Expansion Module

This module incorporates the three functions of Microdrive controller, local area network, and RS232 interface. Connect it to your Spectrum and you can control up to eight Microdrives, communicate with other computers, and drive a wide range of printers.

The potential is enormous, and the module will be available in the early part of 1983 for around £30.



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# WARE SOFTWARE SOFTWARE SOF

# ET'S SAVE THOSE HOSTAGES!

which the staff at the Embassy in Iran were kept hostage by the fanatical student supporters of Khomeini? Then there was Presidont Carter's abortive attempt to rescue the hostages with a commando style raid with choppers flying in low across the

docart Some of the features of that attempted rescue have been incorporated in this latest game for the Vic 20, called Choplifter.

Choplifter is already a best selling game in the U.S. where versions for the Apple and Atari have been on sale for several months. It is not only the game's obvious associations with the hostage affair that have caused the game to be such a big hit in the ILS It is by any standards a most playable game.

You pilot a helicopter on a mission to

# CHOPLIFTER

desert and they will shoot down the hos tages rather than let you get away with

There are also enemy jet fighters and deadly satellites which home in on you at preat speed.

The channer is controlled with the joystick and can be made to bank, dive, hover, and scroll backwards and forwards. You can bomb as well as shoot.

The hombs can be directed to a certain extent by making the chopper bank in the direction you want the bombs to fall. By practising you can catch out those annoving tanks by guiding a bomb onto them instead of being a flying "sitting



rescue the hostages that are waving at you from the ground. Land your craft and let them hop aboard. When you have picked up your maximum load of sixteen men, or as many as you can get away with, fly them back to the U.S. base and set off on another rescue mission

But there are obstacles to your rescue attemnt Tanks appear to blast your helicopter once it lands. The best tactic is to take off and bomb the tank before returning for the frantic hostages.

Some of the hostages are imprisoned in camps so you will have to bomb these open in order to get at them.

We found an easier way to free the imprisoned hostages is to land the chopper on ton of the prison and then take off again. The happy hostages soon come hopping

Your task is again made more difficult by those enemy tanks which are patrolling the

The movement of the rotor-blades has also been well done with convincing sound effects. And when you get blasted by a tank or passing jet there's a horrible metallic crashing sound.

Four readouts keep a check on the number of hostages on board, the number safely brought back to base, and the number killed. The high score is also recorded.

As might be expected the graphics on this version are not quite up to the standard of the Apple and Atari versions though they are none the less impressive. and the game is every bit as playable as

the other versions. Very addictive and definitely one of the best games now on sale for the Vic Choplifter is available at £24.95 from Audingenic of Reading.

Getting started

Value

Playability

9

# **DRIVEN BATTY** IN THE TURE AIN THNNFI

are likely to see on the Spectrum can be found in 3D Tunnel. Bats fly towards you flapping their

wings toads that bounce up and down as they approach, and sinister looking rats which charge at you, shouts to the ground and wagging their tails. There are also ugly black spiders that

swing along the roof of the tunnel spinning their webs as they approach.

48K Spectrum owners have an extra treat at the very end of the tunnel, if they manage to get that far. A silver underground train hurtles out of the dark recesses

The underground train is a masterpiece of programming. You can see the lights twinkling as it approaches. When it becomes larger you can even see the passengers in their seats and hear the rush of wind as the train passes.

My chief criticism of 3D Tunnel is that the names playability does not measure up Although the sensation of depth is adequately created with an infinite number of concentric squares it is too difficult to

Try as I might I could not get the bats in my sights. This is slightly compensated by the large choice of game options which enables you to jump to the next sequence but even after two hours of play I could



not get beyond the bats and onto the next wave through my own skill. The missile graphics are not very clear

- just one faint line of laser fire. And the screen blanks out every time you hit a creature albeit only for a split second.

On the plus side the game offered a comprehensive list of game options including a choice of the three Spectrum joysticks now coming on the market.

Superb graphics and game presentation, but not for the non-persistent. 3D Tunnel is manufactured by New Generation software of Bristol and is available from W. H. Smith

Getting Started

● Value Playability

Penetrator is the best Scramble type available so far for the Sinclair Spectrum. Running on the 48K model only, the graphics are truly impressive

As with arcade Scramble it is not really your score that is of the utmost importance but how far you can get into the Scramble system. Penetrator challenges you to fly through four levels of progressive difficulty.

The first of these is gently undulating terrain with only the ground-to-air missiles to worry about. Soon after this you fly into a tunnel and you will have to move up and down with great precision.

The most difficult stage of the game is the maze with its sharp vertical drops and walls that appear suddenly in front of you. Further still, and you come across bouncing missiles which fall down from the

ceiling as if suspended on springs. Your ship has five flight controls. Up, down thrust forward and brakes which have the effect of slowing down the scrolling terrain to enable you to drop down or

rise up to avoid flying into an obstacle. Playability of Penetrator is greatly improved by a comprehensive list of game options. One or two players can play and you can choose the type of landscape you wish to negotiate with the "terrain editor"

The game stores your current high score and also enables the five top scores of the session to be entered. Despite this, my overall impression was

of a most enjoyable and addictive game. Definitely in the top five Spectrum games. Penetrator is produced by Melbourne House software and is available from W. H.

Smith at £6.95. · Getting started

Value

Playability

# supermarket ...



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you have to collect supplies. Move left, right, up, down and jump (like Donkey Kong). 4 different screens, with a large variety of hazards. Keyboard or joystick control. Lots of

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# HERE COME THE ALIENS AGAI

# GALAXIANS

Remember those twirling swirling aliens cartridge for the 400 and 800 full of them!

This is a most impressive copy of the arcade original I could see no major differences between the computer game and the arcade version

The Galaxians attack in random formation, sometimes peeling off from the uniform columns one by one, or attacking in As in the arcade game the yellow com-

mander ships scream in from behind the blue drone shins and are the key to high scores. If you can pick these off you can score up to eight hundred bonus points. To repel the Galaxians you have only three ships but you can earn a bonus ship by notching up 5,000 points. From then on

you must fire accurately and quickly. The game gets progressively difficult.

Screen instructions report on your current score, the high score, skill level, and a red flag system records the number of

screens wiped clean. Galaxians is a tried and successfully tested arcade game. I could not fight off the tiniest twinge of boredom, however, as I blasted the umpteenth alien

Surely a company like Atari who were big enough to market Pacman when everyone else was blasting aliens doesn't need to revert back to blasting aliens in 1983? I hope not anyway. I'm getting slightly tired

of being a space ace! Still, a good home conversion of a classic arcade game and, if you can afford it a nice one to have in the collection. Galaxians is available from your Atari dealer

now at £28.95 Getting started Value



# PUT SOME STARS IN YOUR FYFS

STARSHIP COMMAND There's more than a touch of Asteroids in Acornsoft's new game for the BBC Model B. Starship Command.

An impressive simulation of movement is created as the aliens scroll past your stationary ship, which is armed with impressive flight controls. Long and short range scanners tell you the positions in the galaxy of the various aliens.

You also have shields to protect you from alien torpedoes. Your mission is to protect a planet from

invading enemy spaceships. When your mission is completed the Starship Commanders will give you their comments on how they think you have performed and

your worthiness for the next mission. These comments are not always very complimentary. The best I managed was "satisfactory" and on more than one occasion the Commanders told me they were "displeased", and "disappointed'

A careful eye on your energy banks is the key to promotion in the Starfleet as this will ensure a successful mission. Each starship has four energy banks which are

You can score points by ramming the aliens but they are worth more if you shoot them

As you work your way up through the ships and missions the challenges get more difficult as the aliens become faster and more accurate with their torpedoes. The game can be played using the

keyboard or joysticks and is available from Acornsoft of Cambridge at £9.95 for the BBC Model B.

Getting started

Value

Playability

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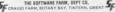
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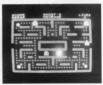
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November 1981. It was then that this magazine first emerged (a little unsteadily) into the primeval twilight of the early days of Sinclair Man. Then huge computer dinosaurs roamed the Earth, thrusting keen young programmers into their

wall-to-wall maws and the magazine looked a little out-of-place surviving on a diet of strange new features and listing material washed up from across the Atlantic

Naturalists are only now beginning to draw conclusions about the close association between the Computer & Video Games story and a little yellow gobbling creature's own evolutionary niche Let us take a closer look at some of the noteworthy steps in the evolution of both:-

## The stripling emerges into twilight with Tarot

on the Tandy, Musical Hangman on the Sharp MZ-80K. Trench on the Atari, Nibblers on the Pet and Super Nim on the Apple. Keith Campbell kicked off his popular Adventure series, Garry Marshall kicked off graphics with a space invader. There were Pacman arcade tips and Max Bramer looked at the first chess machine. Von Kempelen's Turk. December 1981

Growing up fast with Potshot on the Vic-20, Breakout on the Atom, 'Round the Horn' on the Tandy, Mini Golf on the Atari and Pet owners could tackle Rubik's Cube with more confidence. Keith Mott went trouble-shooting on the ZX81 in Kit Korner and Screaming Foul-up fell in love with Terry Wogan.

#### A new year begins with Ted Ball on the trail

of the Bugs in his Practical Programming column. Speed Race for the Texas, Treasure Hunt was a popular Apple adventure much converted by owners of other machines, three 1K wonders for the ZX81 and Changing Hearts for Atari owners. We also saw a seamier side to gaming with a feature

#### on Softporn Adventure! February 1982

Science Fiction author David Langford brought a new look to space games with Space Blockade. Dr Livingstone set up a quest for Sharp owners and Grand Prix gave Tandy owners a racetrack to try out. David Annal POKEd some sounds out of the quieter micros and Arcade Action announced two Pacman lookalikes March 1982

Robin Bradbeer reported from Las Vegas on a country going video crazy - how right he was. ZX81 owners got to grips with Reversi (Othello), there was Startrek III.4 for the Tandy and Octodraw had the Atari moving in

#### eight directions at once. Spring came with Tim Metcalfe's feature on

pinball, a revitalised sector of the arcades fighting back against Space Invaders. Engineer helped Atari owners rebuild the Golden Gate Bridge, Poker for the ZX81 and Ron. Potkin's classic Tandy wargame Kriegspiel. Plus Pacman hit the home Video Screens at

#### May 1982 Computer Moderated Games were investi-

gated by Terry Pratt (the first thoughts on Seventh Empire were voiced about here). Minotaur took the Vic-20 down into a maze and tried to lose it, Pacman arrived in a C&VG listing on a Pet, Minopoly for up to five Sharp businessmen, Meteorstorm took Apple owners by surprise and Earthport II won

## June 1982

The World Cup was upon us and we responded with World Cup Manager - written for the Sharp but without a PEEK or POKE and since converted to many a micro. Vic-20 owners were set affoat on a river torrent in Speedboat, there was Trolls Gold on the Apple and Dog Star Adventure on the Tandy. It also included issue 1 of our BBC Micro publication, Owl.

Do the arcades have anything to offer the fairer sex? America was wooing women with Ms Pacman and we featured this first lady of the arcades in July. Imhotep took the Apple owners back to ancient Egypt, Moon Shuttle sent the Vic into space and Z-Xtra gave 16 names over to Sinclair fans

#### August 1982 Haunted House gave Atoms a shudder.

Space Hopper made Tandy's jump to it and Rocks made Vic owners roll over and beg for more. Imagic launched a range of cartridges for the Atari VCS. Hardcore was ven over to a game-player's guide to the Atari and Sue Garden gave us all a giggle with a computer widow's tale.

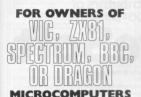
#### September 1982 Tron: out of the arcades came Walt Disney's

graphically stirring film about being trapped in a computer game. We featured it first. Pacman appeared on the Vic-20, there was Star Wars on the Atom and Colditz Adven ture on the Tandy. Issue two of Owl gave BBC owners Speed Trial and X marks the Spot. October 1982

#### C&VG saw out its first 12 issues with Space

Watch on the Spectrum, asking you to befriend the aliens before it's too late! Sharp Defender, Galaxian Colony II on the Apple and the controversial Wild Strawberries on the Atari added to the action. And Pacman appeared in the Bugs cartoon

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